EFFECTIVENESS OF ARRHYTHMIA INTERPRETATION TRAINING (AIT) PROGRAMME ON KNOWLEDGE AND ARRHYTHMIA INTERPRETATION AMONG STAFF NURSES AT A SELECTED HOSPITAL IN CHENNAI

Dissertation submitted to

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

CHENNAI

In partial fulfilment of requirement for the degree of

MASTER OF SCIENCE IN NURSING

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LIST OF ABBREVIATIONS

AACN	-	American Association of Critical Care Nurses
AF	-	Atrial Fibrillation
AHA	-	American Heart Association
AIT	-	Arrhythmia Interpretation Training
AV Node	-	Atrioventricular Node
BACN	-	British Association of Critical Care Nurses
BSM	-	Body Surface Mapping
CAD	-	Coronary Artery Disease
CCU	-	Coronary Care Unit
CPR	-	Cardio Pulmonary Resuscitation
CVD	-	Cardio Vascular Disease
DALYs	-	Disability Adjusted Life Years
ECG	-	Electrocardiogram
ED	-	Emergency Department
FTF	-	Face to Face Learning
GBD	-	Global Burden of Disease
GST	-	General System Theory
ICCU	-	Intensive Coronary Care Unit
ICD	-	Implantable Cardioverter Defibrillator
MMM	-	Madras Medical Mission
MV	-	Millivolt
MCL	-	Modified Chest Leads
RN	-	Registered Nurse
SA Node	-	Sino Atrial Node
SCD	-	Sudden Cardiac Death
SPSS	-	Software Package used for Statistical Analysis
SSM	-	Six Stage Method
VF	-	Ventricular Fibrillation
VPC	-	Ventricular Premature Complexes
VT	-	Ventricular Tachycardia

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G	Electrocardiology Course Certificate for "ECG Basics & Beyond"
H	Certificate of English editing
I	Plagiarism report
J	Photographs, CD

ABSTRACT

ABSTRACT

Electrocardiogram (ECG) interpretation is a core clinical skill in the critical care nursing. It can provide evidence to support a diagnosis, and it is crucial for patient management by helping in diagnosing the abnormal cardiac rhythm. In potentially life threatening situations, the nurse is expected to interpret the rhythm accurately and respond appropriately. To do this the nurse must be well educated in rhythm interpretation. The present study was intended to assess effectiveness of Arrhythmia Interpretation Training (AIT) programme on knowledge and Arrhythmia Interpretation among staff nurses with the following objectives.

Objectives

- To assess the pre and post test level of knowledge and Arrhythmia Interpretations among the staff nurses.
- To correlate post test knowledge and Arrhythmia Interpretation of staff nurses.
- To assess the effectiveness of Arrhythmia Interpretation Training (AIT) programme on knowledge and Arrhythmia Interpretation among staff nurses.
- To associate the mean differed level of knowledge and Arrhythmia Interpretation score with selected demographic variables of staff nurse.

Research Methodology

A pre-experimental one group pretest – post test design was used. The study was conducted at Madras Medical Mission Hospital. 50 samples were selected using purposive sampling technique. Structured self-administered questionnaire was used to assess the knowledge on Arrhythmia and Rhythm Quiz was used to assess the Arrhythmia Interpretation. Immediately after the pretest, arrhythmia interpretation training programme was conducted in three consecutive days. The post test was conducted after 1 week of the training programme. The collected data was analyzed using both descriptive and inferential statistics.

Major Findings

- The overall pre-test level of knowledge revealed that 37(74%) of them had inadequate knowledge and 13(26%) had moderately adequate knowledge and none of them had adequate knowledge. Whereas the overall post-test level of knowledge revealed that 41(82%) had moderately adequate knowledge and 9(18%) had inadequate knowledge and none of them had adequate knowledge.
- Regarding pre-test Arrhythmia interpretation skill, all the staff nurses 50(100%) were having inadequate level of Arrhythmia interpretation. While in the post test, nearly 14(28%) had a moderately adequate interpretation skill and 36(72%) had inadequate level of Arrhythmia interpretation skill.
- The post-test mean score of knowledge was 17.60 ±1.80 and post-test mean score of arrhythmia interpretation was 7.00±0.85. The calculated value of Karl Pearson's correlation(r) = 0.237 shows a moderate positive correlation between post-test knowledge and Arrhythmia interpretation.
- The mean knowledge score in pre-test was 15 with S.D 1.81 and the mean knowledge score in post-test was 17.60 with S.D 1.80. The calculated' value was t = 8.67 which was found to be statistically highly significant at $p<0.001$ level.
- The mean Arrhythmia interpretation score in pretest was 5.4 with S.D 1.34 and the mean Arrhythmia interpretation score in post test was 7.0 with S.D 0.85. The calculated't' value was t = 11.24 which was found to be statistically highly significant at $p<0.001$ level.
- Statistically significant association was found between the mean differed level of knowledge on arrhythmia with the demographic variable age ($\chi^2=5.51$, $p=0.02$) at $p<0.05$ level.

Discussion

The study findings revealed that staff nurses need to improve their knowledge regarding arrhythmia and emphasized the need for Arrhythmia Interpretation Training programme. The study findings revealed that Arrhythmia Interpretation Training programme was effective in improving the knowledge and arrhythmia interpretation of the staff nurses.

Conclusion

The interactive Arrhythmia Interpretation Training (AIT) programme, the educational program used in this research was effective in increasing nurse's knowledge about Arrhythmia and Arrhythmia Interpretation skill. In order to improve patient outcomes, this type of program may be more effective if it were to involve all of the staff members on the unit who are responsible for applying electrodes and selecting the monitoring leads.

INTRODUCTION

CHAPTER – 1

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analysing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action. Critical care nursing offers a unique opportunity in the use of technology, advanced knowledge in pathophysiology, and assessment skills. It provides an opportunity to work collaboratively with physicians and other disciplines to impact patient outcomes. Critical care nurses must have excellent communication skills, caring, and compassion in the face of crisis and uncertainty. Critical care nursing is that specialty within nursing that deals specifically with human responses to life-threatening problems. A critical care nurse is a licensed professional nurse who is responsible for ensuring that acutely and critically ill patients and their families receive optimal care. Critically ill patients are defined as those patients who are at high risk for actual or potential life-threatening health problems.

The more critically ill the patient is, the more likely he or she is to be highly vulnerable, unstable and complex, thereby requiring intense and vigilant nursing care. Critical care nurses will need to keep pace with the latest information and develop skills to manage new treatment methods and technologies. As issues relating to patient care become increasingly complex and new technologies and treatments are introduced, critical care nurses will need to become ever more knowledgeable. This has required experienced critical care nurses to extend their knowledge so that they can provide care that is grounded in evidence.

The aim of critical care nursing is to provide in-depth rationale for critical care practice in an effort to increase the depth of knowledge of nurses who care for the critically ill patient. Every patient, nurse and care facility is different. So providing the right nursing care for critically ill patients is not simply a matter of applying standard nurse-to-patient ratios. The skill of the nurse, the complexity of the patient’s needs and the physical environment of care will all influence nursing requirements.

Cardiovascular disease (CVD) is the leading cause of death in many regions worldwide, accounting for nearly one third of global deaths. Worldwide, cardiovascular disease is estimated to be the leading cause of death in the world by 2020. Acute Myocardial infarction is the most common and most serious life threatening illness that causes more deaths and disability and incurs greater economic costs than any other illness in the world. The mechanism responsible for infarction related arrhythmias include autonomic nervous system imbalance, electrolyte disturbances, ischemia and slowed condition in the zones of ischemic myocardium.

Arrhythmias have been noted in 70 to 95% of patients with Acute Myocardial infarction. Many arrhythmias may occur prior to hospitalization and thus the overall incidence of arrhythmias in acute myocardial infarction may actually be 100%. Arrhythmias are responsible for serious hemodynamic disturbances. The most significant consequence of cardiac arrhythmias is fall in cardiac output and B.P. This may precipitate or aggravate congestive cardiac failure. More than 60% of deaths associated with acute myocardial infarction occur within 1hour of the event and are attributable to malignant arrhythmias usually ventricular fibrillation. Careful monitoring of cardiac rhythm and prompt treatment of arrhythmias has sharply reduced the incidence of in-hospital deaths from arrhythmias.

The incidence type and severity of arrhythmias varies with the area of the infarct. Tachyarrhythmia's are most commonly seen in anterior wall myocardial infarction while Bradyarrhythmias occur frequently in inferior wall myocardial infarction. The overall incidence of arrhythmias and their resultant mortality is more with anterior wall myocardial infarction.

Lown and his colleagues, through their provocative works, proved that intensive coronary care should be attempted in order to prevent the development of serious ventricular arrhythmias, which serves to reduce the mortality from acute myocardial infarction. This realisation led to the proliferation of mobile coronary care units, ICCU units and intermediate care or step down units.

During the past 3 decades, the mortality of patients with acute myocardial infarction treated in intensive coronary care units has declined from30% to about 15%.

The reduction in mortality has resulted from the elimination of primary arrhythmias as a cause of death. Intensive coronary care units allow continuous monitoring of cardiac rhythm by highly trained personnel, administer immediate support, treatment and prophylaxis of arrhythmias and use specialised cardiac interventions.

Nursing has progressed from ancient era to the dawn of modern nursing with the coming of Florence Nightingale and now to 21st century. The progress has been along with the socio-economic cultural changes all over the world, bringing along with it tremendous advancement in science and technology but professional nurse is no more only in the role of carrying out doctors order but is expected to make independent decisions in the day-to-day health care activities. This decision-making ability comes from having relevant knowledge, appropriate attitude and expert skills about health care measures, which together may be referred to as health care competency. Also precision in decision making about a health related activity depends on elaborate health assessment, analysis of the health parameters and identifying specific health problems. One of such important health parameters is ECG .Therefore it is essential that nurses are able to analyse ECG reading accurately, in order to make independent decisions in health care and to assist in therapeutic process.

Diagnostics is an important area of medical knowledge, and an electrocardiogram (ECG) is not only among the most important diagnostic tests but also one of the most difficult topics to teach. As a basic test in clinical work, the ECG plays a key role in the diagnosis of cardiovascular disease. With the incidence of cardiovascular disease noticeably higher at present than in the past the ECG has been increasingly used in clinical work. Electrocardiography (ECG) continues to be the most commonly used laboratory procedure for the diagnosis of heart disease. It was introduced in 1902 by Einthoven, the ECG reflects electrical changes associated with primary or secondary myocardial processes for example coronary artery disease, hypertension, and electrolyte abnormalities Physicians and nurses in most clinical specialities, including general practice are expected to have a sufficient knowledge about ECG interpretation and to make accurate diagnoses, decide on patient management or further referrals.

Owing to the abstract nature of the basic theoretical knowledge of the ECG, its scattered characteristics, and tedious and difficult-to-learn and remember subject matter. Besides, the theoretical knowledge of the ECG is so difficult for nurses to understand that they tend to resort to traditional learning, which often leads to difficulties and errors in clinical interpretation of ECGs. Students and staff nurses tend to be unenthusiastic while learning about the ECG, and its reputation as a difficult concept causes some students to resist learning it and others to give up altogether. An adequate knowledge base should include the ability to define, recognize, and understand the basic pathophysiology of certain electrocardiographic abnormalities. Existing research, suggests that most staff nurses do not feel competent in their interpretation of ECG. In the extension this could negatively influence patient management decisions and could threaten patient safety.

Registered nurses working in diversified critical care areas and telemetry unit's'care for patients who require cardiac monitoring on a regular basis. The RN must quickly and accurately identify life-threatening cardiac dysrhythmias, initiating appropriate treatment. The significance of nurses competency and proficiency in electrocardiographic interpretation and treatment modalities has been well documented (Van Arsdale, 1998). Nursing care is affected by the RN's critical thinking and actions implemented according to interpretation of the patient's electrocardiogram (ECG) rhythm. Accurate interpretation of cardiac rhythms is a fundamental role for the registered nurse working in diversified critical care areas. Nurses play an important role, directly impacting hospital patient mortality in critically ill patients (Van Arsdale, 1998). Registered nurses primarily obtain their critical care knowledge, skills, and expertise through hospital-based staff development programs, preceptors, professional journals, and continuing education opportunities (Lamb & Henderson, 1993).

Structured educational classes facilitating interpretation of ECG rhythms are required in many hospitals for RNs responsible for the care of patients requiring cardiac monitoring. Knowledge and clinical experience impacts the RNs' ability to critically think in relation to application of nursing theory (Leppa, 1997). The degree of critical thinking an RN has developed reflects thinking-learning ability along with the ability to make rapid appropriate decisions in relation to the clinical setting and patient care (Leppa, 1997). Education classes facilitating knowledge of electrocardiographic

interpretation promote competency and proficiency in qualified nursing staff working in diversified critical care areas (Lamb & Henderson, 1993).RNs participate in structured ECG interpretation classes, bringing varying educational backgrounds and experience.

1.2 NEED FOR THE STUDY

According to World Health Organization cardiovascular disease (CVD) is the foremost cause of illness, disability and death in India. CVD contributes to more than 50% mortality in India and still progressing. Unfortunately, a large number of people experiencing CVD are under age of sixty years which affects overall public health status of India. The cardiovascular disease burden globally as well as in India is rising sharply and presently is one of the leading causes of mortality. In 2008, out of the 57 million deaths globally around 63% (nearly 30 million deaths) were due to non-communicable diseases. Approximately 80% of these deaths have been reported to occur in low and middle income countries. Moreover, out of nine million premature death due to non-communicable disease (age<60years) around eight million occurred in low and middle income countries with 6.8% and 5.0% of Disability Adjusted Life Years (DALYs).

Cardiovascular disease have assumed epidemic proportion in India as well, the Global Burden of Disease (GBD) study reported the estimated mortality from coronary heart disease in India to be 1.6 million in the year 2000 which is estimated to increase to approximately 64 million by the year 2015. The projected rise in disease burden due to cardiovascular disease is expected to make it the prime contributors of total mortality and morbidity. Reports on CAD in Indian have shown that Asian Indians are at 3-4 times higher risk of CAD than white Americans, 6 times higher than Chinese and 20 times higher than Japanese. Various independent epidemiological studies conducted in North India suggest that the prevalence of CAD has increased from 1% in 1960 to 10.5% in 1998 in urban population.

- India topped the world with 1531534 cardiovascular deaths in 2002.
- Incidence of CAD in young Indians is about 12%-16% which is higher than any other ethnic group.
- According to INTER HEART study median age of1st heart attack in Indians is 53 years whereas that in Western Europe, China, and Hong Kong is 63 years with more men affected than women.

- Half of the CVD related death (that is 52% of CVD) in India occur below the age of 50 years and about 25% of acute MI in India occur below the age of 40 years.
- Age standardized estimates for Disability Adjusted Life Years lost due to CAD as per 1000 population in India are three times higher than in developed countries.

Increased incidence of smoking, changes in food habits, little physical activity and increased frequency of eating out are some other major reason found to be causing more people in the country to have an ailing heart. Reviewing the register of acute coronary syndrome with 25,000 patients hospitalized with cardiac diseases in various parts of Kerala. It was noted that people in state have 17% more chance of getting heart diseases. This explains the need for medical interpretation. Electrocardiography is the most commonly performed cardiac test. This is because the ECG is a very useful screening tool for a variety of cardiac abnormalities. ECG machines are readily available in most medical facilities and the test is simple to perform risk free and inexpensive.

Nurses being a member of health team should be able to interpret ECG finding up to her extent of practice needed in clinical settings. Interpretation of ECG is the conclusion of identifying normal and abnormal findings among cardiovascular diseases with the help of measurements, rhythm analysis, conduction analysis, wave form description.

A study was conducted to examine emergency nurses' interpretations of abnormal ECGs. The purpose of the study was to determine the concordance of emergency nurses interpretation of abnormal ECG. Seven hundred sixteen ECGs were reviewed; 143 abnormal ECGs were obtained on patients discharged from the ED. The cardiologist's final interpretation was defined as correct, and discordance was any abnormality not identified by the emergency nurses. The overall discordance between emergency physicians' and cardiologists' ECG interpretations was 58.0% ($P < .001$). The most frequently missed findings by emergency physicians were evidence of ischemia/infarct of the anterior wall and atrial fibrillation. Twenty-one of the 83 patients with discordant interpretations were lost to follow-up. Two cases had a clinically significant discrepancy that would have altered patient care. The study concluded that

although the overall discordance was more than 50%, most ED misinterpretations were determined unlikely to have clinical significance.

Studies have shown that nurses often monitored in a single lead (regardless of diagnosis), failed to properly prepare the skin, misplaced electrodes, and were unable to differentiate wide complex QRS tachycardias, all of which could lead to false alarms or misdiagnoses (AACN Practice Alert, 2008; Drew & Funk, 2006; Funk et al., 2009; Keller& Raines, 2005). To prevent error, nurses working on monitored units need to know how to identify patients, who are at risk for potentially lethal dysrhythmias, distinguish between true and false alarms, correctly measure intervals, quickly recognize dysrhythmias, and initiate the appropriate treatment promptly.

In 2004, the American Heart Association (AHA) published a scientific statement recommending standards of practice for dysrhythmia monitoring (Drew et al., 2004). Since large randomized clinical trials did not exist, recommendations were classified according to level of evidence and were based on expert opinions. In addition, an executive summary with recommendations on how to implement the AHA standards was written by Drew and Funk (2006). Based on the data from these two documents, the American Association of Critical-Care Nurses (AACN) wrote a practice alert with specific recommendations for skin preparation, electrode placement, lead selection, and QTc interval measurements (AACN Practice Alert, 2008). The literature was reviewed to determine the best practices for educating staff nurses on ECG or dysrhythmia monitoring. Funk et al. are using an online ECG education program and unit based strategies led by unit champions to implement and sustain change.

“Accuracy of cardiac rhythm interpretation by medical surgical nurses” A study conducted by **Goodridge E, Furst C, Herrick J, Song J, Tipton PH** revealed that nurses care for increasing numbers of patients requiring cardiac monitoring. Ability to identify cardiac rhythms is a key element in nurse’s ability to promote patient safety. These findings suggest a need to improve staff development in the area of cardiac rhythm interpretation.

Morris et al. (2009) measured the outcomes of a critical care course, of which one component was an online web-based ECG tutorial, designed to train the 173 critical care nursing staff who participated. Nurses were assigned to one of three groups based on experience level and the orientation program for each group was tailored to their needs. The program used multiple teaching strategies that included unit specific orientation with preceptors, case studies, human patient simulations, three computerized-assisted online learning modules, instructor-led modules, reference material on compact disc, and pocket guides. One limitation of this study was that the results could not be attributed to any one teaching strategy, since the model included all of them.

Gazarian (2013) analyzed nurses' response to frequency and types of electrocardiography alarms in a non-critical care setting. They aimed to identify nurses' routine practices related to continuous ECG monitoring, frequency and types of alarms, their associated nursing interventions, and the impact on the patient's plan of care. A prospective, descriptive, observational study was used to observe nine registered nurses providing care for patients receiving continuous ECG monitoring in non-critical care areas and data were recorded on a researcher designed observation tool. The findings revealed that nurses responded to 46.8% of all alarms and appropriate nursing interventions were implemented in response to alarms. They highlighted the importance of routine practices related to continue monitoring and revealed gaps in practice related to range of nursing interventions alarm management.

Kern et al (2007) explored on the importance of ECG monitoring after cardiac surgery: postoperative atrial fibrillation and the atrial electrogram. Background of the study says that atrial fibrillation is one of the most common complications after cardiac surgery and is associated with adverse outcomes such as increased mortality, neurological problems, longer hospitalizations, and increased cost of care. In this study they highlighted the importance of role of nurse in the early detection of atrial fibrillation by the recording of an atrial electrogram which is easily obtained from the bedside monitor during the postoperative period.

Drew & Funk (2006) studied on practice standards for ECG monitoring in hospital settings: executive summary and guide for implementation. They concluded that the electrophysiologist must develop a practice standard for hospital ECG monitoring to

diagnose cardiac arrhythmias, acute myocardial ischemia and drug-induced prolonged QT interval.

Keller & Raines (2005) conducted a qualitative study perception to identify and describe critical care nurses' of arrhythmia knowledge. Data collection was done using a semi structured group session, with a moderator and analyzed by the constant comparative method. Sample size consisted of critical care nurses who work in acute care settings. They have conducted five focus groups over a period of 12 months. Participants were asked to describe their perceptions of arrhythmia knowledge and to assign a rating score related to the level of knowledge needed to identify specific arrhythmias. Findings of their study revealed that nurses lack knowledge in arrhythmia interpretation and lead placement. This enforced the need for the development of competency measures and evidence-based teaching strategies on basics of ECG and arrhythmia.

Hand (2002) identified the common cardiac arrhythmia in order to diagnose common cardiac disorders. The study was based on the observation that the interpretation of cardiac arrhythmia is very important in diagnosis of cardiac diseases. The study was conducted by examining the physiology of heart, conductive mechanism and cardiac rhythmic disorders and cardiac monitoring. The study suggested that it is necessary to interpret common cardiac arrhythmia which aids in diagnosing cardiac problems.

The above statistic and related studies point out that the rate of cardiovascular disease accompanied with arrhythmias are markedly increasing every year, thereby need for critical care nursing skills in arrhythmia interpretation and the need for Arrhythmia Interpretation Training programme measures are also high and the researcher had come across the staff nurses ability in diagnosing the abnormal cardiac rhythm. It is observed that published research studies and trials on Arrhythmia Interpretation Training programme on knowledge and arrhythmia interpretation among staff nurses working in critical care units in the Indian setting are very much limited. Hence this study may be considered important in providing empirical evidence and to assess the effectiveness of Arrhythmia Interpretation Training programme on knowledge and arrhythmia interpretation among staff nurses working in cardiac units.

Hence the investigator was interested to the study: "Effectiveness of Arrhythmia Interpretation Training (AIT) programme on knowledge and arrhythmia interpretation among staff nurses" so that continuing educational programmes can be incorporated in order to assess the skill in arrhythmia interpretation and to determine the effectiveness of training programme.

1.3 STATEMENT OF THE PROBLEM

A pre experimental study to assess the effectiveness of Arrhythmia Interpretation Training (AIT) programme on knowledge and arrhythmia interpretation among staff nurses at a selected hospital in Chennai.

1.4 OBJECTIVES

1. To assess the pre and post test level of knowledge and Arrhythmia Interpretation among the staff nurses.
2. To correlate post test knowledge and Arrhythmia Interpretation of staff nurses.
3. To assess the effectiveness of Arrhythmia Interpretation Training programme (AIT) on knowledge and arrhythmia interpretation among staff nurses.
4. To associate the mean differed level of knowledge and arrhythmia interpretation score with selected demographic variables of staff nurse.

1.5 OPERATIONAL DEFINITION

1.5.1 Effectiveness

In this study effectiveness refers to accomplishment of enhanced knowledge and interpretation of arrhythmias among the staff nurses after arrhythmia interpretation training programme.

1.5.2 Arrhythmia Interpretation Training (AIT)

AIT is the training given to the staff nurses for three consecutive days to enhance the knowledge and skill in the interpretation of the arrhythmia. AIT programme consisted of

Information Transfer - is an educational programme covering the aspects of physiology of conduction system, basics of ECG and arrhythmia (that originate from SA node, atria and ventricles) with the help of power points and scanned ECG strips.

Skill Training Programme - consisted of practical work sessions on Arrhythmia Interpretation. The following activities were carried out

- Calculation of heart rates(atrial and ventricular rates)
- Identification of normal rhythms and arrhythmias.
- Differentiation between normal and abnormal rhythms.

Teaching was done with the help of ECG booklet, original ECG strips, worksheets and PPT.

1.5.3 Knowledge

Knowledge refers to the awareness about the arrhythmias and its types. It was measured using a structured self-administered questionnaire regarding physiology of conduction system of heart and basics of ECG.

1.5.4 Arrhythmia Interpretation

In the present study it denotes the ability to recognize the abnormal cardiac rhythms and is measured using a structured self-administered questionnaire which consisted of Rhythm quiz for assessing arrhythmia Interpretation skills which includes case scenario and ECG rhythm strip.

1.5.5 Staff Nurses:

Registered nurses working in the MMM hospital with less than one year experience in cardiac unit.

1.6 HYPOTHESES OF THE STUDY

NH_1: There is no significant relationship between the knowledge and arrhythmia interpretation among the staff nurses.

NH_2: There is no significant difference in the pre and post-test levels of knowledge and arrhythmia interpretation.

NH_3: There is no significant association of mean differed level of knowledge and Arrhythmia Interpretation of staff nurses with their selected demographic variables.

1.7 ASSUMPTION

1. The staff nurses have basic knowledge on anatomy and physiology of human heart.
2. Staff nurses have basic knowledge about electrocardiogram.
3. Staff nurses need to be aware and able to identify the abnormal cardiac rhythms.
4. Staff nurses needs to periodically update their knowledge and skill on arrhythmia interpretation through special training programme

1.8 DELIMITATION

Data collection is delimited to a period of four weeks

1.9 CONCEPTUAL FRAMEWORK

Conceptual framework for the study helps in defining the concepts of interest and proposing relationship among them. The model gives direction for the planning; data collection and interpretation of findings. Concepts are the building blocks of a theory. To describe the relationship of concepts in this study, General system theory by Ludwig Von Bertalanffy has been utilized.

1.9.1 General Concepts of General System Theory

General System Theory is an interdisciplinary practice that describes systems with interacting components. The theory attempted to provide alternatives to conventional models of organization. GST defined new foundation and developments with applicable to numerous areas of study, emphasizing holism over reductionism, organism over mechanism. According to this theory a system is a group of elements that interact with one another in order to achieve the goal. An individual is a system and receives input from environment. This input when processed provides an output. All living system are open, in which there is a continual exchange of matter, energy, and information. The system is cyclical in nature and continues to be so, as long as these parts (input, process, output, and feedback) keep interacting. If there are changes in any of the parts, there will be changes in all the parts. Feedback from within the system or environment provides information. Thus helps the system to determine goals. The following are the major concepts of the theory.

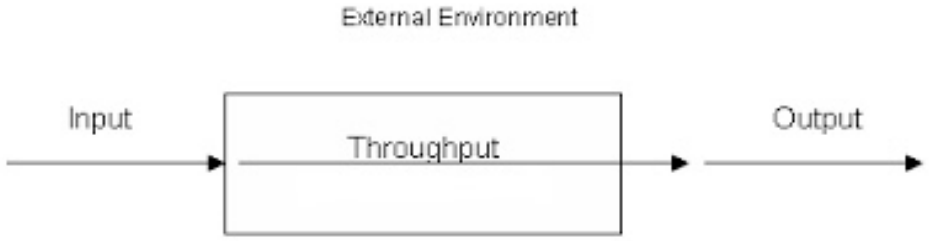

Fig.1.9.1: Ludwig Von Bertalanffy's concept of General System Theory

Input:

Input is defined as any information, energy, or material that enters into the system through its boundary. It is a process by which a system is able to communicate and react with its environments. It is the stimuli and imported materials from the external environment.

Throughput:

Throughput is the process that occurs at some point between input and output process, which enables the input in such a way that, it can be readily used by the system. This stage was the prime potential interventions area for incentives, realignment and to improve outcomes.

Output:

It is the end product of a system. The energy, matter or information is given out by the system as a result of its processes. It is the resulting response or exported materials.

Feedback

- **Negative equilibrating feedback** operate within a system to restore a variable to an initial value.
  - Deviation correcting feedback
  - Negative feedback operates to maintain its present states.

- **Positive equilibrating feedback** operate within a system to drive a variable future from its initial value
    - Deviation amplifying feedback
    - Positive feedback reaches a maximum asymtomatac limit. System operates through differentiation and coordination among its components.

1.9.2 Application of Ludwig Von Bertalanffy's concept of General System Theory

Input

In the present study the input refers to the staff nurses with characteristics age, gender, education level, total year of experience as a staff nurse, work experience in cardiac unit and previous exposure to Arrhythmia Interpretation Training Programme which may influence the knowledge and Arrhythmia Interpretation. Staff nurses are considered to be an open system who is influenced by own internal environment and in continuous interaction with external environment. The investigator assess the demographic characteristics of staff nurses which is their internal environment, level of pre-existing knowledge and arrhythmia interpretation skill to plan the activities to be carried out in throughput process.

Throughput

- Here the investigator administer Arrhythmia Interpretation Training Programme which consisted of

- **Information Transfer** - is an educational programme covering the aspects of physiology of conduction system, basics of ECG and arrhythmia (that originate from SA node, atria, and ventricles) with the help of power points and scanned ECG strips which lasted for 120 minutes.

- **Skill Training Programme** - consisted of practical work sessions on Arrhythmia Interpretation. The following activities were carried out
    - Calculation of heart rates(atrial and ventricular rates)
    - Identification of normal rhythms and arrhythmias.
    - Differentiation between normal and abnormal rhythms.

Output

In this study output refers to the gain in effectiveness in post-assessment; knowledge and Arrhythmia Interpretation scores.

FEEDBACK

It is the evaluation or response of a system. Feedback is the information of environmental responses to the systems output, which is used by the system in adjustment, correction and accommodation to interact with the environment.

If staff nurses are gaining improved knowledge and Arrhythmia Interpretation skill it is considered as positive feedback or deviation amplifying feedback which help investigator to plan for further programme to enhance knowledge.

If the existing knowledge is sustained not improved, the researcher considers this as negative feedback or deviation correcting feedback and plan for reassessment and reinforcement.

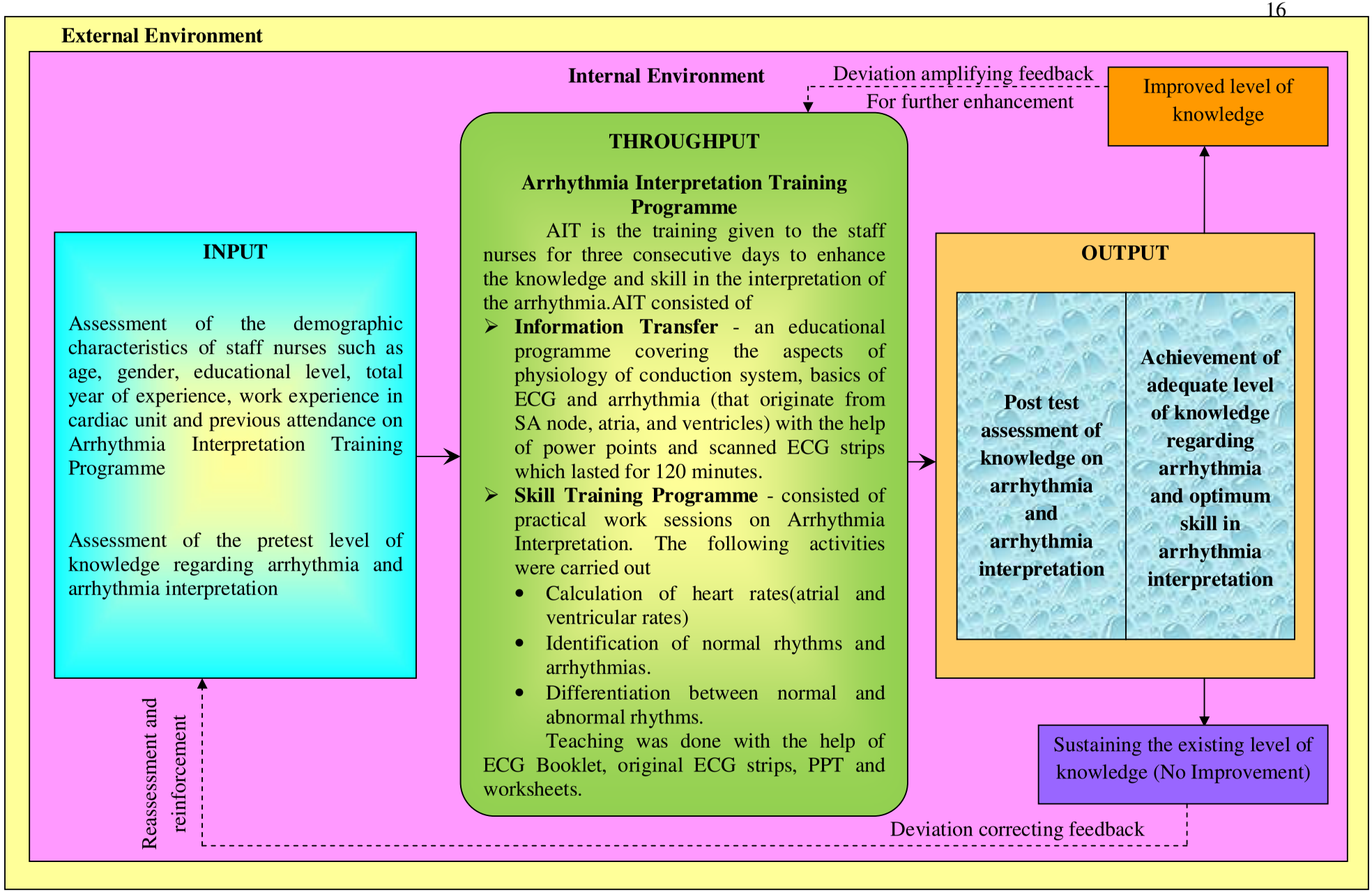

Fig.1.9.2: Conceptual Framework based on Modified Ludwig Von Bertalanffy System Model (1968)

REVIEW OF LITERATURE

CHAPTER – 2

REVIEW OF LITERATURE

A literature review is a compilation of resources that provides the ground work for the study. Every research project is strengthened by preceding studies conducted in the same areas. A review of related literature enables one to get an insight into the various aspects of the problem under study. It uncovers aspects of the problem promising methodological tools, throws light on ways to improve the efficiency of the data collection and suggestions, how to improve or increase the effectiveness of data analysis and interpretation. Review of literature is therefore an essential step in the development of the research project. A brief account of various studies conducted by different investigators and a few citations from books, which were found to be relevant to the present study, are given in this chapter.

The literature review is arranged in the following sections

2.1 Section A: Studies related to general aspects of ECG

2.2 Section B: Studies related to knowledge on Arrhythmias among staff nurses

2.3 Section C: Studies related to Arrhythmia Interpretation skill among staff nurses.

2.1 SECTION A: STUDIES RELATED TO GENERAL ASPECTS OF ECG

Cochet et al (2014) explored the multimode assessment integrating body surface ECG mapping into cardiac imaging in cardiac arrhythmias. They aimed to demonstrate the feasibility of comprehensive assessment of cardiac arrhythmia by combining surface ECG mapping and imaging. The body surface mapping (BSM) was performed using a 252 electrode vest which enabled the computation of epicardial electrocardiogram from body surface potentials. The output was in a 3D cardiac model. The findings revealed that the feasibility can be identified in acquisition, segmentation and registration in all patients. The model were successfully integrated in all patients and used for mapping. The study summarizes that the method BSM helps in the potential application for diagnosis, prognosis, and ablation targeting.

Padhi et al (2014) conducted a study on identifying prevalence of cardiac arrhythmia in a community based chiropractic practice. The study aimed to identify the feasibility of screening for cardiac arrhythmia in chiropractic clinic. The sampling was done using a convenient sampling technique. Findings of the study revealed that out of 76 patients, majority of patients have known or suspected cardiovascular abnormalities. Study results emphasized on the importance of arrhythmia screening chiropractic clinic than any other clinic.

Pathengay & Rath (2014) examined the effectiveness of arrhythmia detection in single lead ECG by combining beat and rhythm level information. The study propose the method for detecting arrhythmia in single lead ECG signals .By applying sequence of pre –processing steps, beat classification and rhythm identification. Subsequently rhythm identification uses a finite state machine to detect abnormal rhythm.

Zhu et al (2014) explored feature extraction from a novel ECG model for diagnosis of arrhythmia. The study focused on computer aided arrhythmia diagnosis using ECG. A location width and magnitude model was proposed for extracting each wave feature in ECG. A mixed approach was presented for estimating the parameters of a real ECG signal. Two kinds of arrhythmia were identified and the atrial premature complexes heart beats and premature ventricular complexes are diagnosed from normal beats using the data from MT-BIH arrhythmia data base. The results in this study demonstrate that the universal arrhythmia diagnosis is more accurate using these parameters.

Wilson et al (2012) examined Panoramic ECG display versus conventional ECG in ischemia detection by critical care nurses. The study aimed to explore the accuracy and certainty of diagnosis of cardiac ischemia using the Panoramic ECG display tool plus conventional 12-lead electrocardiogram (ECG) versus 12-lead ECG alone. An online survey was used to evaluate the analysis of two sets of eight ECGs by British Association of Critical Care Nurses (BACCN) members displayed alone and with the new display device. The study finding revealed that data from 82 participants showed diagnostic accuracy improved in interpreting the ECG traces alone reading with ECG plus Panoramic ECG display. Participants' diagnostic certainty score improved from 41·7% reading ECG alone to 66·8% reading ECG plus Panoramic ECG display tool

(P<0·01, α = 0·05).Researcher concluded that the Panoramic ECG display tool improves both accuracy and certainty of detecting ST segment changes among critical care nurses, when compared to conventional 12-lead ECG alone. They recommended that introduction of the Panoramic ECG display tool into clinical practice could help the patient to receive immediate treatment for myocardial ischemia with the potential for education in morbidity and mortality.

Jevon (2010) studied on the benefits of procedure for recording a standard 12-lead electrocardiogram among staff nurses to prevent misdiagnosis. The procedure for recording a standard 12-lead ECG is given as an educational package including preparation of the patient and of the equipment. Researcher emphasized that the nurse must be familiar with the manufacturer's recommendations regarding the use of the electrocardiograph. His findings suggest that ECG trace needs to be clear to enable accurate and reliable interpretation. This study revealed that standardization of the ECG procedure is important to achieve accurate diagnosis.

Sanoski (2010) reviewed the electrocardiographic findings and clinical presentation of common cardiac arrhythmia. They focused on component and interpretation of 12-lead ECG and compared and contrasted with ECG wave forms and clinical presentations. Study findings revealed that the timing and amplitude of ECG waveform provide valuable information regarding heart rate and rhythm, used in conjunction with clinical signs and symptoms which helps to identify cardiac arrhythmia. Findings of their investigation emphasized on the importance of identifying the ECG rate and amplitude in order to diagnose arrhythmia and follow up treatment.

AACN (2008) published ―AACN Practice Alert: Dysrhythmia Monitoring. The Practice Alert summarized the organization‘s recommendations for dysrhythmia monitoring, including but not limited to:

- selecting Lead VI to diagnose wide QRS complex and Lead II to diagnose atrial activity and measure heart rate;
- placing electrodes in proper placement for accurate diagnosis;
- preparing patient‘s skin before attaching ECG electrodes; and

measuring the QTc interval and calculating the QTc using a consistent lead if at high risk for torsades de pointes.

The AACN is the professional organization that provides certification, education, and evidenced-based resources to nurses practicing in critical care areas, including progressive care and telemetry units. The AACN has issued over a dozen practice alerts to help close the gap between research and practice and to standardize practice for acute and critically ill patients.

Carey (2008) examined the accuracy of electrocardiographic predictors of sudden cardiac death. Background of the problem implied that, non-invasive electrocardiographic indices of depolarization and repolarization may better identify patients who are at an increased risk of SCD. Therefore researcher aimed at developing an approach to identify electrocardiographic changes associated with the highest risk of arrhythmic death among the patient selected for ICD therapy. His study findings revealed that electrocardiographic parameters that may be useful in identifying patients at risk of SCD.

Lancia et al (2008) reviews a comparison between EASI system 12-lead ECGs and standard 12-lead ECGs for improved clinical nursing practice. The study aimed to identify the basic ECG alterations between the accuracy of 12-Lead ECG, obtained through a continuous ECG monitoring system with five cables positioned in EASI mode. Background of the study implies that continuous ECG monitoring is an important device for nursing surveillance and is useful in decreasing adverse events. A sample size of 1164 ECG leads are investigated in EASI mode was compared with ECG leads acquired using the standard procedure with a traditional cardiograph. The study findings showed that ECG monitoring with EASI mode is a valid alternative to the standard 12-lead ECG for cardiac rhythm. They recommended that the routine use of the EASI system represents a valid device for the nursing surveillance of patients who need continuous ECG monitoring, improves clinical nursing practice in Coronary Care Units, supports the reduction of adverse events such as cardiac arrest and reduces the hospital costs.

Wung & Kozik (2008) conducted a review on electrocardiographic evaluation of cardiovascular status. The study aimed to explore on recent research that used ECG, specifically the long-QT interval and microvolt T wave alternans, for the evaluation of

life-threatening ventricular arrhythmias. Study focused on identifying a low-risk group with left ventricular dysfunction. Findings of the study suggested that ECG markers have the potential to aid in the safe administration of individualized medications, avoidance of sudden cardiac death, and provision of a non-invasive strategy.

Cruickshank (2008) conducted a review among general practitioners on initial management of cardiac arrhythmias. Background of the study emphasized on the importance of ECG interpretation and knowledge of resuscitation guidelines. They aimed to provide guide practitioners in managing patients who present with acute arrhythmias in the rural or regional setting. The study findings of their investigation recommended that Coronary care and emergency staff, both medical and nursing, have to the expertise with the ECG using colleague reviewing.

Jang et al (2005) examined the effectiveness of web-based teaching method versus a traditional lecture method on undergraduate nursing students' learning of electrocardiography (ECG). An experimental design was carried out with a sample size of 105 senior nursing students. Researcher developed a Web-based learning program and implemented for 4 weeks. Fifty-four students were assigned to an experimental group in 2002, and 51 were assigned to a control group in 2003. Study findings revealed that Knowledge about ECG among students in the Web-based group was significantly lower than that of students in the control group ($p < .01$). Conversely, the ability to interpret ECG recordings was significantly higher among students in the Web-based group ($p < .05$). No significant differences were found between the two groups in level of motivation or satisfaction with learning. Researcher recommended the importance of self-directed, Web-based ECG learning program appears to be effective in helping nursing students to interpret ECG recordings.

Drew et al (2002) compared new reduced lead set ECG with standard ECG for diagnosing cardiac arrhythmias and myocardial ischemia. Study aimed to identify the ability of new reduced lead set 12 lead ECG with the standard ECG. Data collection was done using data from two prospective clinical trials. Group one consisted of 649 patients admitted with chest pain in ER department. Group two consisted of 509 patients with ischemia. Study revealed that the diagnoses between interpolated ECG and standard ECG are identical. From their study they suggested that Interpolated ECG has its own

advantage for diagnosing wide-QRS-complex tachycardia and bundle branch and fascicular blocks when compared with standard ECG.

Kellen et al (1996) explored the importance of the Cardiac Arrhythmia Suppression Trial and its implications for nursing practice. Background of the study emphasized on need for suppressing ventricular premature depolarization and to improve survival. Interventional strategy consisted of the Cardiac Arrhythmia Suppression Trial was a multicenter, randomized, placebo-controlled trial. Findings of the study suggested that suppression of asymptomatic or mildly symptomatic ventricular premature depolarization in patients using encainide, flecainide, or moricizine failed to improve patient survival. The findings of their investigation suggested that supportive nursing care and arrhythmia monitoring is important until appropriate therapy for the management of arrhythmias. This enforced the importance of Clinical trials that provide an evaluation of therapies and direction for further studies.

2.2 SECTION B: STUDIES RELATED TO KNOWLEDGE ON ARRYTHMIAS AMONG STAFF NURSES

Melita & Elsa (2014) evaluated effectiveness of educational intervention on ECG Monitoring and Interpretation among nursing students. They aimed to identify the effectiveness of teaching program on ECG monitoring and interpretation and to find out the association between knowledge on ECG monitoring and interpretation. An evaluative research approach with one group pretest posttest design was adopted. A sample size of MSc Nursing 1st year students were selected using convenient sampling technique. Educational package consisted of demographic proforma, structured knowledge questionnaire on ECG monitoring and interpretation and tool to assess skill in ECG interpretation. Findings of their study revealed that majority 23(57.5%) had poor skill in interpreting ECG during pre-test whereas majority 36(90%) had achieved good skill in interpreting ECG after post-test. It was found that that there was significant association between the knowledge and the skill of nursing students of nursing students on ECG monitoring with areas of work .This enforced the importance of educational intervention on ECG Monitoring and Interpretation.

Tubaishat & Tawallah (2014) analyzed the effect of cardiac arrhythmia simulation on nursing student's knowledge acquisition and retention. It provided an extremely useful part of teaching process. The study aimed to evaluate the effect of simulation – based teaching among nursing students. A randomized control trial with pretest and posttest were used to measure the knowledge. The teaching method used is simulation scenarios to experimental group and traditional lectures to control group. The result highlighted that there was a significant improvement in the knowledge after the intervention in both groups. However the experimental group demonstrated significant increase in knowledge on cardiac arrhythmia than control group. Therefore the study suggested that the simulation lead to a significant improvement in knowledge of cardiac arrhythmia among nursing students.

Laura et al (2012) evaluated knowledge retention and clinical application of basic arrhythmia among staff nurses. A descriptive study with pretest/posttest was carried out to evaluate knowledge retention and clinical application of basic arrhythmia knowledge. A sample size of 138 staff nurses were selected using convenient sampling technique. Basic orientation programme was carried over a week and the result doesn't showed a significant improvement in knowledge retention. After the orientation programme an educational package which consisted of simulation was administered to the staff nurses over an 18-month period. Sixty-two (45%) RNs completed the whole course with pretest, posttest, and simulation and One hundred and two (74%) RNs completed only the pretest and posttest. Data showed knowledge retention and clinical application in rhythm identification between posttest score and clinical application in simulation testing at 3 months. The study showed a significant difference in knowledge retention pre- and post-program. Findings of the study recommended having in depth training programme regarding basic arrhythmia along with hospital orientation programme.

Johnson & Robertson et al (2012) conducted a study to assess the effectiveness of nurse's ability to interpret basic electrocardiogram strips accurately using different learning modalities. The background of the study is lecture or face-to-face education; however, changes in the health care environment, including resource constraints, have necessitated examination of this practice. The method used for the study is a descriptive pre-/post-test method was used to determine the effectiveness of alternative teaching

modalities on nurses' knowledge and confidence in electrocardiogram (EKG) interpretation. A convenience sample of 135 nurses was recruited in an integrated health care system in the South-eastern United States. Nurses attended an instructor-led course, an online learning (e-learning) platform with no study time or 1 week of study time, or an e-learning platform coupled with a 2-hour post-course instructor-facilitated debriefing with no study time or 1 week of study time. Instruments included a confidence scale, an online EKG test, and a course evaluation. The results of the study indicated that there is statistically significant differences in knowledge and confidence were found for individual groups after nurses participated in the intervention. Statistically significant differences were found in pre-knowledge and post-confidence when groups were compared. The study revealed that organizations that use various instructional methods to educate nurses in EKG interpretation can use different teaching modalities without negatively affecting nurses' knowledge or confidence in this skill.

Salah & Hakima (2012) evaluated the effectiveness of nursing education program on nurse's knowledge toward arrhythmia. A quasi-experimental design was carried out using purposive sampling. Sample size consisted of 80 staff nurses .They were divided into two groups, study group consisted (40) nurses exposed to the nursing educational program and control group consisted (40) nurses were not exposed to the program. Educational package consisted of self-administered questionnaire which included the aspects of Anatomy and physiology of the heart and conduction system, Leads and placement of electrodes, polarization the heart, Time duration for impulses transition and reading ECG paper, cardiac rhythm ventricular premature contractions (VPCs), atrio-ventricular block and anti-arrhythmic drugs. Reliability of instrument was determined through the use of test and retest method. Findings of their investigation revealed a positive effectiveness of educational programme regarding nurse's knowledge towards arrhythmia. Outcome of the study recommended that all nurses should involve in educational programmes in order to develop staff competency.

Chang & Hsu (2010) evaluated the efficacy of multimedia instruction among nurses in electrocardiography learning. The researchers aim was to develop multimedia-assisted teaching materials focused on the subject of electrocardiography and to discuss the resulting efficacy of electrocardiography education relative to the overall in-service

nursing education curriculum. The method consisted of Quasi-experimental with Seventy-seven nurses using purposive sampling. An EKG knowledge questionnaire was employed to collect data and was analyzed using the SPSS 15.0 for Windows software package. Researcher reported that the experimental group scored significantly higher on ECG knowledge after the intervention than the control group. They highlighted the importance of multimedia-assisted instruction and recommended its usage in the nursing education curriculum in order to increase learner interest and motivation.

Jeffries (2005) and Morris et al. (2009) conducted two other studies with nursing staff that evaluated the effectiveness of critical care courses, each including computer based ECG training. Both studies found that all participants successfully completed the Computer-based ECG course and demonstrated competency with ECG interpretation, which was one component of the critical care course. Due to the limited number of studies on nursing staff, studies that evaluated ECG teaching methods with nursing students were also reviewed. Two studies of nursing students compared interactive computer-based learning formats to traditional classroom instruction on interpreting dysrhythmias and performing12-lead ECG (Jang, Hwang, Park, Kim, & Kim, 2005; Jeffries, Woolf, & Linde, 2003). They found computer-based formats to be just as effective as, if not more effective as traditional formats.

Two studies on effectiveness of written self-study packets for teaching dysrhythmias to nursing staff showed conflicting results. **Cadden (2007)** found that a self-study learning package, supplemented with unit-based materials and learning activities with an educator, effectively developed staff competency regarding the operation of ECG monitors and the interpretation of arrhythmias. Van Arsdale (1998), however, concluded that a self-instruction reading packet was not as beneficial as instructor-led classes, which he based on lower post-test scores and students' comments that they would have preferred interaction with an instructor.

Jang et al (2005) analysed feasibility of applying the blended learning program on undergraduate nursing students' learning of electrocardiography. The educational package includes the face-to-face (FTF) learning and e-learning. A sample size of 56 senior nursing students had undergone the blended learning program implemented for 4 weeks. The study findings revealed that a significant improvement was noted in learning

achievement. No significant differences were noted between FTF and web-based learning in learning motivation. Their results indicated that Learning satisfaction and students' experience in taking this course revealed some positive effects of blended learning. They recommended the use of blended learning program for undergraduate nursing students will provide an effective learning model.

Keller & Raines (2005) analysed the knowledge on arrhythmia among critical care nurses. The study focused to identify and describe perception of arrhythmia knowledge of critical care nurses. A qualitative research design was used and conducted the study. Data collection was done using focus group technique using semi structured group sessions. Data were analyzed constant comparative method. The results highlighted that the critical care nurses have basic intermediate and advanced level of arrhythmia knowledge but they lack skill in identifying specific cardiac arrhythmia such as tachyarrhythmia's and heart block. Findings of their study emphasized on the importance of developing competency among critical care nurses.

Khan (2004) analysed the physiological basis and interpretation of the ECG as clinical skills. Background of the study implied the importance of understanding of the principles underlying generation of the ECG and application of this knowledge in interpretation of ECG. In this study researcher introduced the practitioner to the basic processes and mechanisms that govern formation of the normal ECG. Study concludes that the basic knowledge on ECG should help the practitioner to have a clearer understanding of interpreting the abnormalities seen on an ECG.

Jeffries et al (2003) compared a traditional instructor-led program to a student-led program using a compact disk read only memory (CD ROM) to teach students how to perform 12 lead ECGs. Both groups received the same self-study module, but the experimental group received an interactive, multimedia CD ROM embedded with virtual reality instead of traditional lecture and demonstration. The results showed that both groups experienced significant improvement from pre-test to post-test scores with no considerable differences between groups. The authors concluded that instructor-led classroom teaching and student-led self-study with interactive multi-media CD ROM were each equally effective in teaching skills for performing 12-lead ECGs. Both methods were similar in students' self-ratings of satisfaction and self-efficacy. The

researchers reported high validity and reliability of the questionnaires and inter-rater reliability for the procedural checklist. Even though this course did not include instruction about dysrhythmia recognition, it did include instruction on correct lead placement, which is relevant to this project.

Hutchisson et al (2003) conducted a study on basic electrocardiogram interpretation among perioperative nurses. Educational package focused on the areas of changes in practice, rapid ECG interpretation and the conduction and coronary artery systems of the heart are to enable identification of normal and abnormal ECG rhythms. Researcher explained about each arrhythmia and potential causes and probable treatments are discussed.

Van Arsdale (1998) conducted four different methods for teaching cardiac dysrhythmias. The study was conducted at three moderate sized hospitals in a rural setting over two years using 244 registered nurses from the emergency room, critical care, and telemetry units. The two most effective methods for teaching arrhythmia interpretation to staff nurses were those with instructor-led classes in two-hour sessions conducted once a week over 10 weeks (Group 1) and those conducted twice a week over five weeks (Group 2), as evidenced by significantly higher post-test scores than the following two groups. All of the nurses from Group 3, who received a one week course with two-hour sessions twice a day, indicated too much new information was presented and they felt uncomfortable with their skills. Almost all of the nurses (91%) in Group 4, who received the self-instruction reading packet, indicated some classroom sessions would have been beneficial for asking questions or discussing rhythms. Limitations of this study included that the nurses were not randomized to groups, analysis was not provided on whether the groups were similar, and the course did not include bundle branch blocks. In addition, the self-study packet did not include any form of computer assisted instruction.

Stewart & Lowe (1994) conducted a review which emphasized the importance of knowledge and attitude of nurses working in medical wards on knowledge of ECG interpretation and defibrillation. A sample size of 112 qualified staff nurses were questioned regarding resuscitation experience and knowledge of ECG interpretation and defibrillation. Study findings revealed that Seventy-five per cent of nurses were involved

in CPR as first responders but only 18% had used a defibrillator during a cardiac arrest. Findings of their study suggested that staff nurses are willing to receive training in advanced cardiac life support and they possess some basic practical knowledge. Outcome of the study recommended training programme to nursing staff to improve their efficiency in resuscitation efforts.

Pettinger & Woods (1993) conducted a descriptive survey on paediatric critical care nurses' knowledge of cardiac dysrhythmias. They correlated knowledge level with demographic variables (education, nursing experience, certification, supplemental training, and area of employment and geographic region of residence).The study was conducted in American Association of Critical-Care Nurses' 19 geographic regions of the United States. Intervention consisted of a criterion-referenced, self-administered test regarding paediatric dysrhythmias was administered to a sample size of 1000 paediatric critical care nurses. Study results revealed that there is a significant association between mean total test score and with demographic variables. They concluded that nurses overall knowledge of dysrhythmias was low and recommended continuing education programs for paediatric critical care nurses.

2.3 SECTION C: STUDIES RELATED TO ARRYTHMIA INTERPRETATION SKILL AMONG STAFF NURSES

Orchard et al (2014) investigated the evolution of iPhone ECG screening by practice nurses and receptionists for atrial fibrillation The background of the study put forward that a single-lead iPhone electrocardiograph (iECG) with a validated AF algorithm could make systematic AF screening feasible in general practice. The qualitative study consist of pilot screening test was the receptionists and practice nurses screened patients aged ≥65 years using an iECG. They conducted fourteen semi-structured interviews with GPs, nurses, receptionists and patients were audio-recorded, transcribed and analysed thematically. The findings revealed that among Eighty-eight patients, 17 patients (19%) were in AF (all previously diagnosed). Findings suggested that nurses were confident in using the device, explaining and providing screening whereas receptionists reluctant in interpreting iECG.

Varvaroussis et al (2014) conducted a systemic review of two teaching methods for cardiac arrhythmia interpretation among nursing students. They aimed to compare the

six-stage method (SSM) with a descriptive teaching method in a single educational intervention. The method consisted of a randomized trial with 134 undergraduate nursing students. The education package consisted of brief instructional session, assigned to group A (SSM) and group B (descriptive teaching method). Samples had undergone a written test in cardiac rhythm recognition, immediately after the educational intervention (initial exam) and were also examined with an unannounced retention test (final exam),one month after instruction. Results shown that there were no significant difference between two teaching methods and was equally effective in interpreting cardiac arrhythmias. They concluded that SSM effectively develops staff competency for cardiac arrhythmia interpretation and suggested to implement the SSM method in a group with pre-existing ECG knowledge.

Werner et al (2014) conducted a prospective quantitative survey on electrocardiogram interpretation skills among ambulance nurses to describe ambulance nurses' practical electrocardiogram (ECG) interpretation skills. A convenience sample collection was done among ambulance nurses. The score of the ECG test was correlated against the questions in the questionnaire regarding both general ECG interpretation skill and ability to identify acute myocardial infarction using Mann-Whitney U test, Kruskal-Wallis test and Spearman's rank correlation. The study result showed that there was no correlation between ECG interpretation skill and demographic factors. From their study they found out that the ambulance nurses lack ECG interpretation skills and they recommended to improve their experience in coronary care unit to have higher ECG interpretation skill.

Zhang & Hsu (2013) conducted a study to assess the effectiveness of a continuing education program on nurses' knowledge of interpretation of 12-lead electrocardiograms (ECGs) in emergency Centre, Zhongnan Hospital, Wuhan University, Wuhan, China. The study used a quasi-experimental design. Fifty-two nurses, including 23 nurses working in an emergency department, 12 nurses working in a cardiology department and 17 nurses working in an intensive care unit (ICU) were recruited for the study. Two learning methods were used: a lecture-based education program and a self-learning handbook. The effectiveness of the methods was evaluated using a questionnaire containing questions in five domains. Data analysis showed that before training, nurses who worked in the cardiology department scored higher in basic

ECG knowledge than those in the emergency department and ICU; test scores of nurses who had worked for 2-10 years were higher than else. The post-test total and domain scores at 2 weeks, and 4 months after the lecture-based learning and 1 month after a self-learning ECG handbook was presented were higher than the pre-test scores. Results of this study indicated that prior to training, ECG knowledge differed with respect to the nurses' different demographic characteristics. The lecture-based education program and self-learning handbook material were effective in improving the nurses' ECG knowledge.

Summer et al (2012) conducted a study on knowledge regarding basic arrhythmia and clinical application among staff nurses. The study was descriptive that focused to evaluate the knowledge retention over time and clinical application of basic arrhythmia knowledge followed by an orientation programme. The data showed significant difference in knowledge retention within a month and the staff nurse become efficient in the rhythm identification using simulation.

Tai et al (2012) conducted a prospective cohort study to determine the capability of nurses to identify ventricular fibrillation (VF) and ventricular tachycardia (VT) rhythms on an ECG and their ability to carry out subsequent defibrillation in a teaching hospital in Hong Kong. The intervention consisted of a questionnaire and a teaching session focusing on the identification of rhythms in cardiac arrest and defibrillation skills. Correct answers for both ECG interpretation and defibrillation decisions scored one point for each question. The differences in mean scores between the pre-teaching and post-teaching questionnaires of all nurses were calculated. The study concluded that nurses improved in defibrillation decision-making skills and confidence after appropriate brief, focused in-house training.

Zimmerman et al (2012) analyzed the reliability of interpretation of the ECG QRS width by nurses in the setting of sodium channel poisoning. Researcher aimed to identify the ability of nurses to recognize and measure a widened QRS complex, the hallmark of myocardial sodium channel toxicity. A prospective study was carried out with a sample size of thirty-six emergency department and critical care nurses employed at a tertiary care hospital. The study subjects were divided into three groups and asked to interpret 12 ECGs (five normal and seven wide QRS). Educational package consisted of visual instruction delivered to group 1, group 2 received scripted verbal instructions and

group 3 are considered as control group. The entire instructional package does not contain any specific QRS measurement instructions. The nurse data was compared with physician interpretation. The study findings showed that the nurses identified a wide QRS complex most of the time (77%), but had difficulty in accurately measuring the QRS duration (44%).

McRae ME et al (2010) evaluated efficiency of Cardiac surgical nurses' use of atrial electrograms to improve diagnosis of arrhythmia. The background of the study implied that practice standard for electrocardiographic monitoring in hospitals recommends use of atrial electrograms after cardiac surgery to help diagnose cardiac arrhythmias. The aim of the study was to determine whether use of atrial electrograms significantly improves nurses' ability to diagnose cardiac arrhythmias. A sample size of 165 staff nurses were given the educational package which consisted of standardized educational session on obtaining and interpreting atrial electrograms who had not previously received such education. In a second test, the same rhythms were provided along with atrial electrograms to 261 nurses. The findings of the study indicated that use of atrial electro grams significantly increased overall arrhythmia interpretation scores. Study findings emphasized that there is no correlation between experience with atrial electrograms and arrhythmia test scores. They concluded that nurses' use of atrial electrograms improves diagnoses of cardiac arrhythmias.

Woodrow (2010) conducted a study to determine the ability of staff nurses to interpret the electrocardiograms. This article introduces the basic principles of reading electrocardiograms (ECGs) for nurses who are unfamiliar with reading them. For more experienced practitioners there are a number of useful articles and books (e.g. Hampton, 1992a, b) that will help further their knowledge. The ECG records cardiac electrical activity as a graph; interpretation is illustrated here by sinus rhythm. A single ECG lead (lead II) is used throughout this article. Atrial fibrillation is described to show a contrasting dysrhythmia. Specific nursing care is suggested for patients being monitored or having ECGs taken.

Funk et al (2009) presented their baseline data on 1,821 patients and it revealed substandard ECG monitoring. This included incorrect electrode placement, inaccurate

rhythm interpretation, over-monitoring for arrhythmias, under-utilization of ischemia monitoring, and failure to monitor for QTc prolongation when indicated.

Weatherburn et al (2009) studied about the role of off-site expert support for nurses undertaking ECGs in primary care. The researcher aimed to assist the staff nurses in decision-making process by providing the results of an audit from eight general practices and two walk-in centres. The study results showed that among 373 patients who had an ECG performed in practice, 76 had altered management decisions, 14 were saved hospital referral (11 of these from one walk-in centre), 18 were admitted to an acute hospital (10 from the same Walk-in centre), and another 24 were referred to hospital for investigation.

Mant et al (2007) conducted a study to assess the accuracy of diagnosing atrial fibrillation by primary care practitioners and interpretative diagnostic software: analysis of data from screening for atrial fibrillation in the elderly (SAFE) trial. The objective of the study was to assess the accuracy of general practitioners, practice nurses, and interpretative software in the use of different types of electrocardiogram to diagnose atrial fibrillation. Sample size consisted of 2595 patients aged 65 or over screened for atrial fibrillation .The intervention consisted of all electrocardiograms were read with the Biolog interpretative software, and a random sample of 12 lead, limb lead, and single lead thoracic placement electrocardiograms were assessed by general practitioners and practice nurses independently of each other and of the Biolog assessment. The results of the study revealed that general practitioners detected 79 out of 99 cases of atrial fibrillation on a 12 lead electrocardiogram and practice nurses detected a similar proportion of cases of atrial fibrillation. The study concluded that many primary care professionals cannot accurately detect atrial fibrillation on an electrocardiogram, and interpretative software is not sufficiently accurate to circumvent this problem, even when combined with interpretation by a general practitioner.

Drew & Funk (2006) in an executive summary of the AHA Practice Standards from Drew et al. (2004) with recommendations for nurses on how to implement them into practice. The key nursing responsibilities were described for arrhythmia monitoring, ST-segment ischemia monitoring, QTc interval monitoring, lead selection, electrode placement, and staff training on ECG concepts and skills. Detailed charts were provided

on what content should be included in ECG education, although no recommendations were made on what should be taught in basic or advanced courses. The recommended topics in the guideline charts included electrophysiology concepts, ECG dysrhythmias and abnormalities, and specific monitoring skills.

Drew et al (2006) conducted a study to assess the accuracy of bedside electrocardiographic monitoring. The purpose of the study was to determine which leads nurse's select for monitoring, and the accuracy of lead placement. From a random sample of nurses who were members of the American Association of Critical-Care Nurses, 302 returned a monitoring questionnaire. Average critical care experience was 8.5 years. Lead II was most often selected (74%) for single-channel monitoring; lead II plus V1 (or MCL1) were most often selected (87%) for dual-channel monitoring. Only 37% of nurses demonstrated proper technique for obtaining their single lead of choice; even fewer (13%) demonstrated proper technique for obtaining their dual leads of choice. These results suggested that misdiagnosis of arrhythmias such a wide complex tachycardia in monitored patients may be caused by inappropriate lead selection as well as inaccurate lead placement.

In a related evidenced-based medicine article on electrocardiography, **Zipes et al. (2006)** reported on practice guidelines for management of ventricular arrhythmias, including diagnosing, medications, implanted devices, ablation, and surgical interventions developed by the American College of Cardiology, the American Heart Association, and the European Society of Cardiology. Important nursing implications that were included in this analysis were how to manage specific arrhythmias, what symptoms to assess, and when to obtain a resting 12-lead ECG (e.g. for all patients who were being evaluated for ventricular arrhythmias).

Docherty (2003) studied on the effect of 12-lead ECG interpretation and chest pain management. Background of the study highlighted the need to identify and fast-track patients with an acute coronary syndrome in order to optimize myocardial salvage and reduce door-to-needle time (DoH, 2001; Castle, 2002). In this study the researcher investigated the role of nurses in acute clinical areas are ability to record and interpret 12-lead electrocardiograms. Researcher concluded that it is often the nurse who initially assesses implements and coordinates care for patients with chest pain.

Docherty & Douglas (2003) evaluated the effectiveness electrocardiogram interpretation in atrial arrhythmias by staff nurses. Study focused on the signs and symptoms and management of patient with this arrhythmia.

Docherty & Douglas (2003) evaluated the effectiveness interpretation of electrocardiogram rhythm strips. Study focused on anatomy and physiology related to cardiac conductivity and arrhythmias.

Ross (1997) conducted a study to assess the effectiveness of teaching cardiac rhythm strip interpretation within a cross-cultural context using Nicaraguan nurses as a model. Critical care nurses have been interpreting rhythm strips in the United States for years, and recently this concept has become a new responsibility for critical care nurses in Nicaragua. The focus of this article is on the unique challenges encountered by a nurse educator when teaching critical care concepts to non-English-speaking critical care nurses. Using Nicaraguan nurses as a model, the author shares experiences of teaching advanced concepts to non-English-speaking nurses. The specific concept taught was rhythm strip interpretation and the potential value in nursing care practice.

Scrima (1997) conducted a study among the medical surgical nurses to determine the ability of arrhythmia interpretation. Researcher emphasized on the role of nurses in interpreting cardiac rhythms and to develop critical thinking skills. Study focused on cardiac anatomy, physiology, and cardiac properties provided a framework for interpreting and understanding rhythms.

RESEARCH

METHODOLOGY

CHAPTER – 3

RESEARCH METHODOLOGY

Research methodology is the systematic way of doing a research to solve a problem. The phase of the study includes research design, variables, setting, population, sample and sample size, criteria for sample selection, sampling technique, description of the tool, content validity and reliability of the tool, pilot study, data collection procedure and plan for data analysis. On the whole it gives a general pattern of gathering and processing the research data.

3.1 RESEARCH APPROACH

As the effectiveness was to be scientifically determined, a quantitative research approach was used.

3.2 RESEARCH DESIGN

The research design is a blue print for conducting the study and it guides the researcher in planning and implementing the study in a way that is most likely to achieve the intended goal**.**

Research design selected for the present study is pre experimental study.

Pretest O_1	**Intervention** ×	**Post test** O_2
Assessment of knowledge regarding arrhythmia and arrhythmia interpretation skill	Administration of arrhythmia interpretation training programme for 3 consecutive days	Assessment of post-test level of knowledge regarding arrhythmia and arrhythmia interpretation after one week of Arrhythmia Interpretation Training programme.

× - Intervention (Arrhythmia Interpretation Training programme)

O_1 - Observation 1

O_2 - Observation 2

3.3 VARIABLES

3.3.1 Independent Variable

Arrhythmia Interpretation Training Programme.

3.3.2 Dependent Variable

Knowledge on Arrhythmia and Arrhythmia interpretation**.**

3.3.3 Demographic Variables

Age, gender, education level, total year of experience, work experience in cardiac unit and any previous experience of attending training on Arrhythmia Interpretation Training Programme.

3.4 RESEARCH SETTING

The study was conducted in Madras Medical Mission Hospital, Mogappair, Chennai, which is a Cardiac speciality hospital with 283 beds with nearly 75 critical care beds to provide comprehensive care to patients with cardiac disorders. The study was conducted in Cardiac unit of MMM hospital. Cardiology department includes cardiac electrophysiology, interventional cardiology and cardiac surgery. Total bed strength of cardiac unit is 200 under various areas such as Coronary Care Unit, Paediatric Intensive Care Unit, Adult Intensive Care Unit, Intensive Care Unit II, Intensive Care Unit III, Neonatal Intensive Care Unit, Radial Lounge, General Wards, Paediatric General Ward and Deluxe rooms. Average outpatient census is nearly 800 per week.

3.5 POPULATION

3.5.1 Target Population

All the staff nurses working in cardiac units of hospitals in Tamilnadu.

3.5.2 Accessible Population

All the staff nurses working in the cardiac units of Madras Medical Mission Hospital.

3.6 SAMPLE

The study sample comprised of the entire staff nurses working in the cardiac units of Madras Medical Mission Hospital who fulfilled the sample selection criteria.

3.7 SAMPLE SIZE

Sample size for main study consisted of fifty staff nurses.

3.8 SAMPLING TECHNIQUE

Samples were selected using Non-probability purposive sampling method.

3.9 CRITERIA FOR SAMPLE SELECTION

3.9.1 Inclusion Criteria

1. Staff nurses with less than one year of experience in cardiac unit of MMM hospital.
2. Staff nurses with Diploma or Basic Nursing Degree qualification.

3.9.2 Exclusion Criteria

1. Staff nurses who are not willing to participate.
2. Staff nurses who had undergone intensive training on ECG / Arrhythmia.

3.10 DEVELOPMENT AND DESCRIPITION OF THE TOOL

An extensive literature review and discussion with the experts and the investigators own professional experience helped the investigator in the development of tool for data collection.

The instrument envisaged for use in this study was divided into three parts.

Part 1 –Assessment of socio demographic data which consisted of age, gender, education level, total year of experience, work experience in cardiac unit and any previous experience of attending training on Arrhythmia Interpretation Training Programme.

Part 2 – Structured Self-administered Questionnaire to assess the knowledge regarding physiology of conduction system of heart, basics of ECG and Arrhythmia. The SAQ consisted of 30 questions. Each question had only one correct answer. Each correct answer carries a score of 1 and wrong answer was scored as 0. The total score was 30. The scores were interpreted as below

Scoring and interpretation

Percentage	Category
<50%	Inadequate knowledge
50-75%	Moderately adequate knowledge
>75%	Adequate knowledge

Part 3 – Structured self-administered Questionnaire which consists of Rhythm quiz booklet for assessing arrhythmia interpretation skill which included case scenario and ECG strip. The rhythm quiz booklet consisted of 15 ECG strips with or without case scenario. Each item had one right interpretation and three wrong interpretations as options. Each right interpretation was given a score of one and zero was scored for wrong interpretation. The maximum score was 15 which were interpreted as follows.

Scoring and interpretation

Percentage	Category
<50%	Inadequate knowledge
50-75%	Moderately adequate knowledge
>75%	Adequate knowledge

3.11 VALIDITY OF THE TOOL

The content validity of the tool was established in consultation with 6 experts in the field of medicine (electrophysiology) and Nursing. Experts were requested to give their opinion and suggestions regarding relevance, appropriateness, accuracy, and degree of agreement in each item of the tool. The first draft of the knowledge questionnaire consisted of 25 items, based on the suggestions and recommendations 5 more items were added and two questions were modified. Questions regarding arrhythmia interpretation skill were validated by electrophysiology experts. Based on suggestions and recommendations 3 questions were modified. In the final draft, 30 items included in

knowledge questionnaire and in assessing arrhythmia interpretation skill there were 15 questions in the Rhythm Quiz. Tools were given in English language. The language used in the tool was clear, simple, and unambiguous. Respondents were able to understand and respond to the items in the tool.

3.12 RELIABILITY OF THE TOOL

The reliability of the knowledge tool was assessed using split – half method. Correlation coefficient was computed using Karl Pearson's Correlation.

$$r = \frac{N(\Sigma XY) - (\Sigma X)(\Sigma Y)}{\sqrt{[N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2]}}$$

The reliability r' was estimated using the formula r' = 2r/1+r and the estimated reliability value for knowledge tool was r = 0.7.

The reliability of the Arrhythmia Interpretation skill was assessed using inter-rater method and the estimated reliability value for arrhythmia interpretation tool was r = 0.638.

3.13 ETHICAL CONSIDERATION

The study data collection process started after obtaining permission from the Institution Review Board of MMM College of Nursing and Ethical Committee of Madras Medical Mission hospital. Researcher also obtained permission from Head of Cardiology Department. The following ethical principles were followed in the course of study.

A. BENEFICENCE

The investigator followed the fundamental ethical principle of beneficence by adhering to:

a) The right to freedom from harm and discomfort

The study was beneficial for the participants as it enhanced the knowledge and arrhythmia interpretation skill among staff nurses.

b) The right to protection from exploitation

The investigator explained the procedure and the nature of the study to the participants and ensured that none of the participants were exploited or denied fair treatment.

B. RESPECT FOR HUMAN DIGNITY

The investigator followed the second ethical principle of respect for human dignity. It includes the right to self-determination and the right to self-disclosure.

a) The right to self determination

The investigator gave full freedom to the participants to decide voluntarily whether to participate in the study, to with draw from the study and right to ask questions.

b) The right to full disclosure

The researcher has fully described the nature of the study, the person's right to refuse participation and the researcher's responsibilities based on which the informed consent both oral and written consent was obtained from the participants.

C. JUSTICE

The researcher adhered to the third ethical principle of justice; it includes participant's right to fair treatment and right to privacy.

a) The right to fair treatment

The researcher selected the study participants based on the research requirements, no vulnerable or compromised candidate were selected as study participants.

b) The right to privacy

The researcher maintained the participant's privacy throughout the study.

D. CONFIDENTIALITY

The researcher maintained confidentiality of the data provided by the study participants.

3.14 PILOT STUDY

Data collection process for pilot study started after obtaining permission from the Institution Review Board of MMM College of Nursing and Ethical Committee of Madras Medical Mission hospital. The samples were selected by purposive sampling method as per the inclusion criteria and purpose of study was explained to the participants. Informed consent was obtained. Data collection was done from the staff nurses of Coronary Care Unit of the Madras Medical Mission Hospital, who were not included in the main study. Data collection was done in three phases. During Phase I, pre-test assessment of knowledge on arrhythmia and arrhythmia interpretation skill was assessed using the structured self-administered questionnaire and the rhythm quiz. During the Phase II, arrhythmia interpretation training programme was given to the staff nurses starting from the same day of the pretest and continued for 2 more consecutive days. During the Phase III, post test was conducted after 1 week of the training programme. Collected data was coded, tabulated and analyzed using both descriptive and inferential statistics. The data were amenable to statistical analysis and feasible and tool was reliable.

3.15 DATA COLLECTION PROCEDURE

The main study data collection process started after obtaining permission from the Institution Review Board of MMM College of Nursing and Ethical Committee of Madras Medical Mission hospital. Researcher also obtained permission from Head of Cardiology Department. Study was conducted among staff nurses working in cardiac units of Madras Medical Mission hospital. A total of 50 samples were selected by purposive sampling method as per the inclusion criteria in coordination with the nursing supervisors of cardiac unit. Staff nurses were divided into three batches. Their duty schedules were arranged accordingly to participate in the training programme. The data collection procedure was carried out in three phases.

Phase I: Assessment of pre-test knowledge and arrhythmia interpretation among the staff nurses was done in batches which took nearly 30 minutes.

Phase II: Following the pre-test, Arrhythmia Interpretation Training which consisted of Information Transfer and Skill Training was given using PPT in batches which lasted for 2 hours. Arrhythmia Interpretation Skill Training was given in batches using ECG

booklets, PPT, Original ECG Strips and Worksheets during the next 2 consecutive days. This session lasted for 2½ hours each day.

Phase III: Post test was conducted after 1 week of Arrhythmia Interpretation Training in batches.

The collected data was coded and tabulated for analysis.

Phases of Data Collection	Activity Done	Time and Duration
Phase I Pre Assessment phase	Pretest assessment of level of knowledge regarding arrhythmia and arrhythmia interpretation based on the following aspects • Physiology of conduction system of heart • Basics of ECG • Arrhythmia interpretation	It took nearly 30 minutes to complete pretest assessment
Phase II Intervention phase	Arrhythmia interpretation training programme was administered through Information Transfer and Skill Training Programme.	Each group took 7½ hours to complete 3 sessions. 1st Session-Information transfer which lasted for 2 hours. 2nd Session–Skill training programme on Basic ECG for 2½ hours 3rd Session – Skill training on arrhythmia interpretation for 2½ hours
Phase III Post Assessment phase	Posttest assessment was conducted 1 week after Arrhythmia Interpretation Training Programme.	It took 30 minutes to complete the post test

FIG.3.15.1: Schematic Representation of Data Collection Procedure

3.16 DATA ANALYSIS PROCEDURE

Data collected were analysed using Descriptive and Inferential statistics.

3.16.1 Descriptive Statistics:

1. Analyses of sample characteristics such as socio-demographic data were analysed using frequency and percentage.
2. Frequency, Percentage, Mean and Standard Deviation was used to assess the knowledge and arrhythmia interpretation.
3. Karl Pearson- correlation coefficient was used to assess the relationship between the post test knowledge and arrhythmia interpretation of staff nurses.

3.16.2 Inferential Statistics:

4. Effectiveness of Arrhythmia Interpretation Training Programme on the level of knowledge and practice among staff nurse was analysed using paired ‘t’ test.
5. Chi-square test used to find out association of mean differed knowledge regarding arrhythmia and arrhythmia interpretation among staff nurses with their selected demographic variables.

DATA ANALYSIS AND INTERPRETATION

CHAPTER – 4

DATA ANALYSIS AND INTERPRETATION

This chapter deals with analysis and interpretation of the data collected from fifty staff nurses at selected hospital, Chennai. The data collected were organized, tabulated and analyzed according to the objectives. The findings based on the descriptive and inferential statistical analysis are presented under the following sections.

ORGANIZATION OF THE DATA

Section A: Description of demographic variables of staff nurses

Section B: Assessment of pretest and posttest level of knowledge and arrhythmia interpretation among staff nurses.

Section C: Assessment of correlation of knowledge and Arrhythmia Interpretation of staff nurses in the post test.

Section D: Assessment of effectiveness of Arrhythmia Interpretation Training Programme on level of knowledge and arrhythmia interpretation among staff nurses.

Section E: Assessment of association of mean differed score of knowledge and Arrhythmia Interpretation of the staff nurses with their selected demographic variables.

SECTION A: DESCRIPTION OF DEMOGRAPHIC VARIABLES OF STAFF NURSES.

Table 4.1: Frequency and percentage distribution of demographic variables of staff nurses.

N = 50

Demographic Variables	**No.**	**%**
Age in years		
20 – 22	15	30.0
23 – 25	35	70.0
26 – 28	0	0.0
Gender		
Male	0	0.0
Female	50	100.0
Educational Level		
General Nursing	0	0.0
B.Sc. Nursing	50	100.0
Post Basic Nursing	0	0.0
Total years of experience as a staff nurse		
1-5 years	50	100.0
6-10 years	0	0.0
11-15 years	0	0.0
Work experience in cardiac unit		
0 - 4 months	23	46.0
5 - 8 months	27	54.0
9 – 12 months	0	0.0
Attended to any training program on Arrhythmia Interpretation		
Yes	0	0.0
No	50	100.0

Table 4.1 shows the frequency and percentage distribution of demographic variables of staff nurses. With regard to age in years, 35(70.00%) of the samples were in age group of 23 – 25 years. All of them 50(100%) were female with the education qualification of B.Sc Nursing. All of them 50(100%) had 1-5 years of experience as staff nurse. More than half of the staff 27(54%) had 5-8 months experience in cardiac unit, followed by 0-4 months 23(46%) and none of them attended any training program on arrhythmia interpretation.

The above description highlighted that most of the staff nurses were found between the age group of 23-25 years and are females with educational qualification of B.Sc nursing. All of them had 1-5 years of experience as staff nurse. More than half of them had 5-8 months experience in cardiac unit. None of them had attended any training programme on Arrhythmia Interpretation.

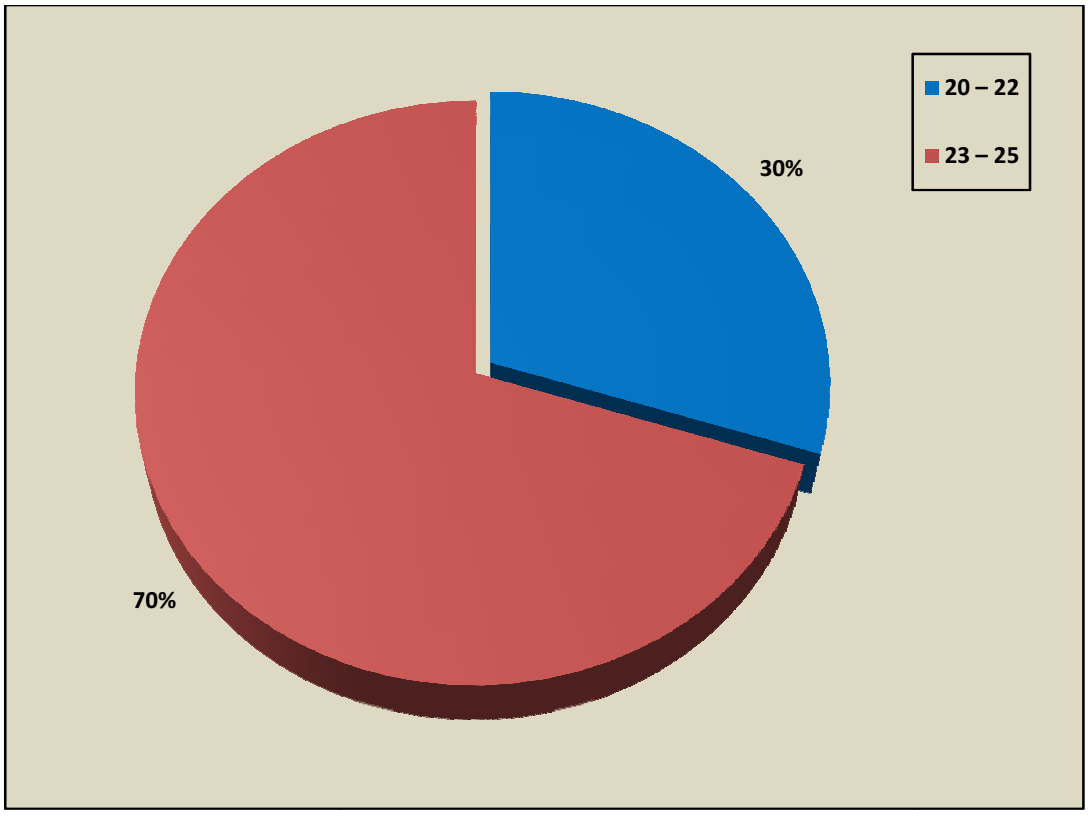

Fig.4.1.1: Percentage distribution of age of the staff nurses

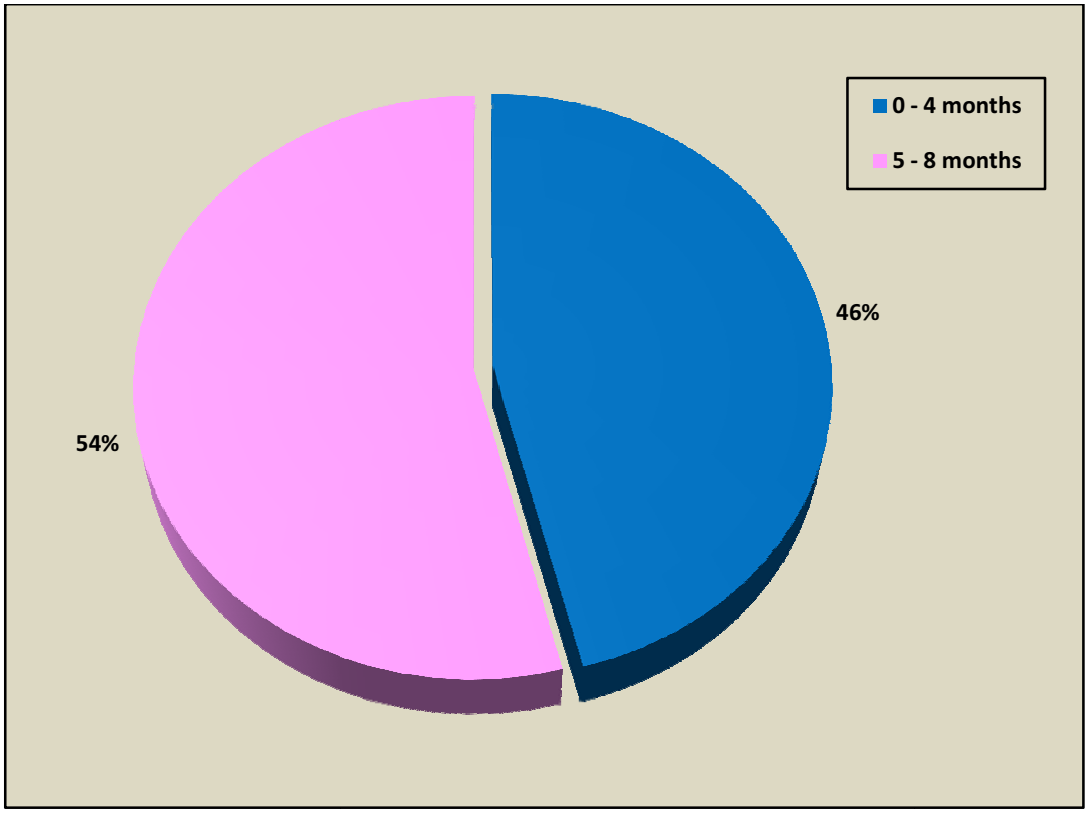

Fig.4.1.2: Percentage distribution of work experience of staff nurses in cardiac unit

SECTION B: ASSESSMENT OF PRETEST AND POSTTEST LEVEL OF KNOWLEDGE AMONG STAFF NURSES

Table 4.2: Frequency and percentage distribution of pretest level of knowledge among staff nurses.

N = 50

Knowledge Domains	Inadequate (<50%)		Moderately Adequate (50 – 75%)		Adequate (>75%)	
	No.	%	No.	%	No.	%
General physiology	14	28	20	40	16	32
Basic ECG	35	70	11	22	4	8
Arrhythmia	33	66	17	34	0	0
Overall	**37**	**74**	**13**	**26**	**0**	**0**

The table 4.2 shows frequency and percentage distribution of pretest level of knowledge regarding arrhythmia among staff nurses.

Regarding general physiology of conduction system of heart, 20(40%) of the staff nurses had moderately adequate knowledge and followed by adequate knowledge level 16(32%).

With respect to basic ECG, majority 35(70%) had in-adequate, 11(22%) had moderately adequate knowledge level and 4(8%) had adequate level of knowledge.

Regarding arrhythmia knowledge level 33(66%) of the staff nurses had inadequate, 17(34%) had moderate adequate and none of them had adequate level of knowledge.

The overall pretest level of knowledge revealed that 37(74%) of them had inadequate knowledge and 13(26%) had moderately adequate knowledge and none of them had adequate knowledge.

Table 4.3: Frequency and percentage distribution of post test level of knowledge among staff nurses.

N = 50

Knowledge Domains	Inadequate (<50%)		Moderately Adequate (50 – 75%)		Adequate (>75%)	
	No.	%	No.	%	No.	%
General physiology	1	2	16	32	33	66
Basic ECG	17	34	22	44	11	22
Arrhythmia	19	38	31	62	0	0
Overall	**9**	**18**	**41**	**82**	**0**	**0**

The above table 4.3 shows frequency and percentage distribution of post test level of knowledge on general physiology and basic ECG among staff nurses.

Regarding the general physiology of conduction system of heart, 33(66%) of the staff nurses had adequate knowledge, 16(32%) had moderately adequate knowledge and only 1(2%) had inadequate knowledge.

With respect to basic ECG, majority 22(44%) had moderately adequate, 11(22%) had adequate level of knowledge and 17(34%) had inadequate level of knowledge.

Regarding arrhythmia knowledge level, 31(62%) of the staff nurses had moderately adequate knowledge, 19(38%) had inadequate and none of them had adequate level of knowledge.

The overall posttest level of knowledge revealed that 41(82%) had moderately adequate knowledge and 9(18%) had inadequate knowledge and none of them had adequate knowledge.

The above findings highlighted that many of the staff nurses were moved from the level of inadequate to moderately adequate knowledge which indicated that AIT was effective in improving the knowledge.

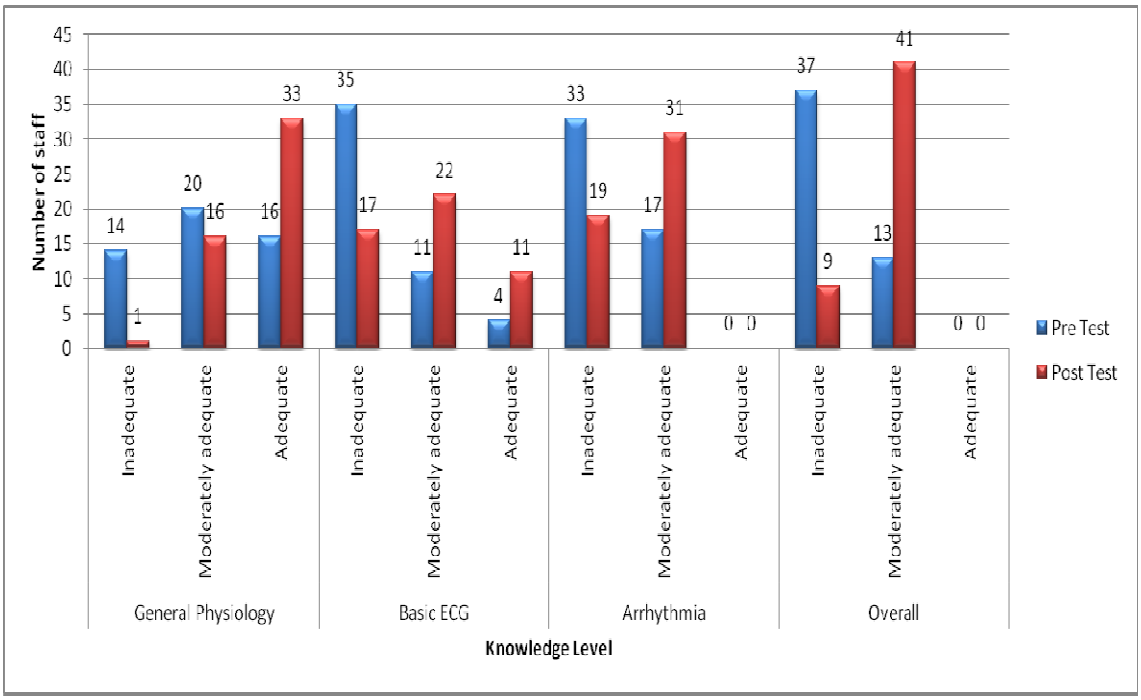

Fig.4.3: Percentage distribution of pre and posttest level of knowledge among staff nurse

Table 4.4: Mean and S.D of pre and posttest knowledge among staff nurses

N = 50

Knowledge	Mean	S.D
Pretest	15.0	1.81
Posttest	17.60	1.80

The above table 4.4 shows mean and S.D of pre and posttest knowledge among staff nurses.

The study revealed that the pretest mean score of knowledge was 15.0 with the S.D of 1.81 where as in the posttest the mean score of knowledge was 17.60 with the S.D of 1.80.

The findings revealed that mean knowledge score is increased in the posttest which in turn indicate the effectiveness of Arrhythmia Interpretation Training.

Table 4.5: Frequency and percentage distribution of Pre and post test level of Arrhythmia Interpretation among staff nurses.

N = 50

Arrhythmia interpretation	Inadequate (<50%)		Moderately Adequate (50 – 75%)		Adequate (>75%)	
	No.	%	No.	%	No.	%
Pre test	50	100	0	0	0	0
Post test	36	72	14	28	0	0

The above table 4.5 shows frequency and percentage distribution of pre and posttest level of Arrhythmia interpretation among staff nurses.

Regarding pretest arrhythmia interpretation skill, all the staff nurses 50(100%) were having inadequate level of arrhythmia interpretation. While in the post test, nearly 14(28%) had a moderately adequate interpretation skill and 36(72%) had inadequate level of Arrhythmia interpretation skill.

The analysis revealed that in the pre-test, all the staff nurses 100% were having in adequate arrhythmia interpretation skill. After the implementation of Arrhythmia Interpretation Training Programme the post test result revealed that nearly 30% have moved from the level of inadequate to the moderately adequate.

The study findings revealed that, none of the staff nurses had adequate arrhythmia interpretation skill, so they need to improve their skill regarding arrhythmia interpretation and emphasized the need for Arrhythmia Interpretation Training Programme.

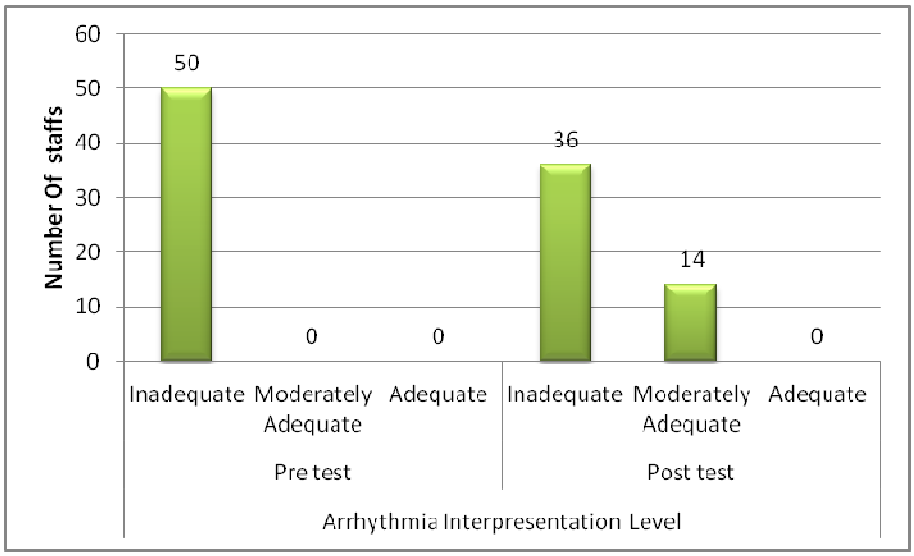

Fig.4.4.1: Percentage distribution of pre and post test level of Arrhythmia interpretation among staff nurses

Table 4.6: Mean and S.D of pre and posttest Arrhythmia Interpretation among staff nurses

N = 50

Arrhythmia Interpretation	Mean	S.D
Pretest	5.4	1.34
Posttest	7.0	0.85

The above table 4.6 shows mean and S.D of pre and posttest Arrhythmia Interpretation skill among staff nurses

The study revealed that the pretest mean score of arrhythmia interpretation skill was 5.4 with the S.D of 1.34 where as in the posttest the mean score of arrhythmia interpretation skill was 7.0 with the S.D of 0.85.

The findings revealed that mean arrhythmia interpretation skill score is increased in the posttest which in turn indicate the effectiveness of Arrhythmia Interpretation Training.

SECTION C: ASSESSMENT OF CORRELATION OF THE KNOWLEDGE AND ARRHYTHMIA INTERPRETATION AMONG THE STAFF NURSES IN THE POST TEST.

Table 4.7: Correlation between post test knowledge and Arrhythmia Interpretation score among staff nurses.

N = 50

Variables	Mean	S.D	'r' Test
Post test knowledge	17.60	1.80	r = 0.237
Post test Arrhythmia interpretation	7.00	0.85	p = 0.097, NS

N.S – Not Significant

The above table 4.7 shows that the post-test mean score of knowledge was 17.60±1.80 and post-test mean score of arrhythmia interpretation was 7.00±0.85. The calculated value of Karl Pearson's correlation(r) = 0.237 shows a positive correlation between post-test knowledge and arrhythmia interpretation level but not found to be statistically significant.

The result showed that there was a positive correlation between the mean differed knowledge regarding arrhythmia and arrhythmia interpretation among staff nurses, which indicated that when the level of knowledge regarding arrhythmia increases arrhythmia interpretation skill also increases.

SECTION D: ASSESSMENT OF EFFECTIVENESS OF ARRHYTHMIA INTERPRETATION TRAINING PROGRAMME ON LEVEL OF KNOWLEDGE AND ARRHYTHMIA INTERPRETATION AMONG STAFF NURSES.

Table 4.8: Comparison of pretest and post test knowledge score among staff nurses.

N = 50

Knowledge		**Mean**	**S.D**	**Paired 't' Test**
Physiology of conduction system	Pre	3.06	0.95	t =4.73***
	Post	3.86	0.78	p = 0.001, S
Basic ECG	Pre	2.88	1.15	t =4.73***
	Post	3.86	0.78	p = 0.001, S
Arrhythmia	Pre	9.06	1.63	t =2.94***
	Post	9.88	1.74	p = 0.005, S
Overall knowledge level	Pre	15.00	1.81	**t =8.67*** **
	Post	17.60	1.80	**p = 0.001, S**

***p<0.001, S – Significant

Table 4.8 shows the effectiveness of Arrhythmia interpretation training programme on level of knowledge.

The mean knowledge score in pretest was 15 with S.D 1.81 and the mean knowledge score in post test was 17.60 with S.D 1.80. The calculated 't' value was t = 8.67 which was more than the table value and was found to be statistically highly significant at p<0.001 level. This clearly indicates that there was significant difference between the pretest and post test level of knowledge on Arrhythmia interpretation.

The above statistical description highlighted that the mean gained knowledge score for staff nurses was 2.60 which showed that knowledge level improved. Statistical analysis also proved that Arrhythmia Interpretation Programme had significant impact on improving knowledge regarding arrhythmia between pre-test and post-test among staff nurses at p<0.001 level.

Table 4.9: Comparison of pretest and post level of Arrhythmia Interpretation among staff nurse.

N = 50

Arrhythmia Interpretation	Mean	S.D	Paired 't' Test
Pre test level	5.4	1.34	**t=11.24*** **
Post test level	7.0	0.85	**P=0.001, S**

***p<0.001, S – Significant

Table 4.9 shows the effectiveness of level of Arrhythmia interpretation training programme

The mean Arrhythmia interpretation score in pretest was 5.4 with S.D 1.34 and the mean Arrhythmia interpretation score in post test was 7.0 with S.D 0.85. The calculated 't' value was t = 11.24 which was more than the table value and was found to be statistically highly significant at p<0.001 level. This clearly indicates that there was significant difference between the pretest and post test level of Arrhythmia interpretation skill.

Statistical analysis proved that Arrhythmia Interpretation Programme had significant impact on improving arrhythmia interpretation skill among staff nurses at p<0.001 level.

SECTION E: ASSESSMENT OF ASSOCIATION OF MEAN DIFFERED SCORE OF KNOWLEDGE AND ARRHYTHMIA INTERPRETATION AMONG STAFF NURSES WITH THEIR SELECTED DEMOGRAPHIC VARIABLES.

Table 4.10: Association of mean differed score of knowledge among staff nurses with their selected demographic variables.

N = 50

Demographic variable Knowledge level		**Mean differed value (2.6)**				**Chi square**
		Less than		**Greater than**		
		No.	**%**	**No.**	**%**	
Age	21 – 23	11	73.3	4	26.7	**χ^2=5.51 d.f = 1 P=0.02 S***
	24 – 26	13	37.1	22	62.9	
	27 – 28	0	0	0	0	
	>28	0	0	0	0	
Work experience in cardiac unit	0-4 months	10	43.5	13	56.5	χ^2=0.349 d.f = 1 P=0.380 N.S
	5-8 months	14	51.9	13	48.1	
	9-12 months	0	0	0	0	

*p<0.05, S – Significant, N.S – Not Significant

The above table 4.10 shows the association between the mean differed levels of knowledge with selected demographic variables of staff nurse. The study findings revealed that there was statistically significant association was found between the mean differed level of knowledge on arrhythmia with the demographic variable age (χ^2=5.51, p=0.02) at p<0.05 level.

The findings revealed that staff nurses aged between 24 – 26 years gained more knowledge on arrhythmia.

Table 4.11: Association of mean differed score of Arrhythmia Interpretation among staff nurses with their selected demographic variables.

N = 50

Demographic variable Arrhythmias		Mean differed value (1.6)				Chi square
		Less than		Greater than		
		No.	%	No.	%	
Age	21 – 23	7	46.7	8	53.3	χ^2=0.09 d.f = 1 P=0.50 N.S
	24 – 26	18	51.4	17	48.6	
	27 – 28	0	0.0	0	0.0	
	>28	0	0.0	0	0.0	
Work experience in cardiac unit	0-4 months	13	56.5	10	43.5	χ^2=0.725 d.f=1 P=0.285 N.S
	5-8 months	12	44.4	15	55.6	
	9-12 months	0	0.0	0	0.0	

N.S – Not Significant

The above table 4.11 shows the association between the mean differed levels of arrhythmia interpretation skill with selected demographic variables of staff nurse. The study findings revealed that there was no statistically significant association was found between the mean differed level of arrhythmia interpretation skill with the demographic variables at $p<0.05$ level.

DISCUSSION

CHAPTER – 5

DISCUSSION

The focus of this chapter is to analyse the results in comparison with other research studies and to make recommendations for this site and other settings. It also includes the limitations of this study and implications for further research.

The findings from this study support the importance of more structured approaches to determine the practice standards for electrocardiographic monitoring in hospitals and effectiveness of Arrhythmia Interpretation Training Programme. Careful monitoring of cardiac rhythm and prompt treatment of arrhythmias has sharply reduced the incidence of in-hospital deaths from arrhythmias. The results and significant findings are discussed under the following headings.

The findings of the demographic profile of the staff nurses

Table 4.1 shows the frequency and percentage distribution of demographic variables of staff nurses. With regard to age in years, 35(70%) of the samples were in age group of 23 – 25 years. All of them 50(100%) were female with the education qualification of B.Sc Nursing. All of them 50(100%) had 1-5 years of experience as staff nurse. More than half of the staff 27(54%) had 5-8 months experience in cardiac unit, followed by 0-4 months 23(46%) and none of them attended any training program on arrhythmia interpretation.

The above description highlighted that most of the staff nurses were found between the age group of 23-25 years were females with educational qualification of B.Sc nursing. All of them had 1-5 years of experience as staff nurse. More than half of them had 5-8 months experience in cardiac unit. None of them had attended any training programme on Arrhythmia Interpretation

The findings of the study are discussed in terms of the objectives and hypotheses.

The first objective of the study was to assess the pre and post-test level of knowledge and Arrhythmia Interpretations among the staff nurses.

. The overall pre-test level of knowledge revealed that more than half of them 37(74%) had inadequate knowledge and 13 (26%) had moderately adequate knowledge regarding the domains physiology, ECG basics of ECG and Arrhythmia Interpretation.

The overall post-test level of knowledge revealed that majority 41(82%) had moderately adequate knowledge and 9(18%) had inadequate knowledge.

Regarding pre-test Arrhythmia interpretation skill, all the staff nurses (100%) were in-adequate knowledge level. While in the post test, nearly thirty percent had a moderately adequate interpretation skill and rest of them were in-adequate.

The result of the present study was similar with those conducted by

Keller & Raines (2005) conducted a qualitative study perception to identify and describe critical care nurses' of arrhythmia knowledge. Data collection was done using a semi structured group session, with a moderator and analyzed by the constant comparative method. Sample size consisted of critical care nurses who work in acute care settings. They have conducted Five focus groups over a period of 12 months. Participants were asked to describe their perceptions of arrhythmia knowledge and to assign a rating score related to the level of knowledge needed to identify specific arrhythmias. Findings of their study revealed that nurses lack knowledge in arrhythmia interpretation and lead placement. This enforced the need for the development of competency measures and evidence-based teaching strategies on basics of ECG and arrhythmia.

The second objective of the study was to correlate knowledge and Arrhythmia Interpretation of staff nurses in the post test.

The table 4.5 shows that the post-test mean score of knowledge was 17.60±1.80 and post-test mean score of arrhythmia interpretation was 7.00±0.85. The calculated value of Karl Pearson's correlation(r) = 0.237 shows a positive correlation between post-test knowledge and Arrhythmia interpretation level but not found to be statistically significant.

The result showed that there was a positive correlation between the mean differed knowledge regarding arrhythmia and arrhythmia interpretation among staff nurses, which indicated that when the level of knowledge regarding arrhythmia increases arrhythmia interpretation skill also increases.

Thus the null hypotheses NH_1 stated that "**There is no significant relationship between the knowledge and arrhythmia interpretation among the staff nurses"** was accepted.

The present study results are consistent with following study results

McRae ME et al (2010) evaluated efficiency of Cardiac surgical nurses' use of atrial electrograms to improve diagnosis of arrhythmia. A sample size of 165 staff nurses were given the educational package which consisted of standardized educational session on obtaining and interpreting atrial electrograms who had not previously received such education. In a second test, the same rhythms were provided along with atrial electrograms to 261 nurses. The findings of the study indicated that use of atrial electro grams significantly increased overall arrhythmia interpretation scores. Study findings emphasized that there is no correlation between experience with atrial electrograms and arrhythmia test scores.

The third objective of the study was to assess the effectiveness of Arrhythmia Interpretation Training programme (AIT) on knowledge and arrhythmia interpretation among staff nurses.

The mean knowledge score in pretest was 15 with S.D 1.81 and the mean knowledge score in post test was 17.60 with S.D 1.80. The calculated 't' value was t = 8.67 which was more than the table value and was found to be statistically highly significant at $p<0.05$ level. This clearly indicates that there was significant difference between the pre-test and post-test level of knowledge on Arrhythmia interpretation.

The above statistical description highlighted that the mean gained knowledge score for staff nurses was 2.60 which showed that knowledge level improved. Statistical analysis above proved that Arrhythmia Interpretation Programme had significant impact on improving knowledge regarding arrhythmia between pre-test and post-test among staff nurses at $p<0.05$ level.

The mean Arrhythmia interpretation score in pretest was 5.4 with S.D 1.34 and the mean Arrhythmia interpretation score in post test was 7.0 with S.D 0.85. The calculated 't' value was t = 11.24 which was more than the table value and was found to be statistically highly significant at $p<0.05$ level. This clearly indicates that there was significant difference between the pretest and post test level of Arrhythmia interpretation skill.

The above statistical description highlighted that the mean gained arrhythmia interpretation score for staff nurses was 1.60 which showed that arrhythmia interpretation skill has improved. The above statistical analysis proved that Arrhythmia Interpretation Programme had significant impact on improving regarding between arrhythmia interpretation skill pre-test and post-test among staff nurses at $p<0.05$ level.

The statistical analysis above proved that Arrhythmia Interpretation Training Programme had significant impact in improving the knowledge and arrhythmia interpretation among staff nurses at $p<0.001$ level. Thus the null hypotheses NH_2 stated that "**There is no significant difference in the pre and post-test level of knowledge and arrhythmia interpretation"** was not accepted.

The result of the present study was consistent with the following studies.

Zhang & Hsu (2013) conducted a study to assess the effectiveness of a continuing education program on nurses' knowledge of interpretation of 12-leadElectrocardiograms (ECGs) in emergency Centre. The study used a quasi-experimental design. Two learning methods were used: a lecture-based education program and a self-learning handbook. Data analysis showed that before training, nurses who worked in the cardiology department scored higher in basic ECG knowledge than those in the emergency department and ICU; test scores of nurses who had worked for 2-10 years were higher than else. The post-test total and domain scores at 2 weeks, and 4months after the lecture-based learning and 1 month after a self-learning ECG handbook was presented were higher than the pre-test scores.

Salah & Hakima (2012) evaluated the effectiveness of nursing education program on nurse's knowledge toward Arrhythmia. A quasi-experimental design was carried out using purposive sampling. Sample size consisted of 80 staff nurses .They

were divided into two groups, study group consisted (40) nurses exposed to the nursing educational program and control group consisted (40) nurses were not exposed to the program. Educational package consisted of self-administered questionnaire which included the aspects of Anatomy and physiology of the heart and conduction system, Leads and placement of electrodes, polarization the heart, Time duration for impulses transition and reading ECG paper, cardiac rhythm ventricular premature contractions (VPCs), atrio-ventricular block and anti-arrhythmic drugs. Findings of their investigation revealed a positive effectiveness of educational programme regarding nurse's knowledge towards arrhythmia.

Melita &Elsa (2014) evaluated effectiveness of educational intervention on ECG Monitoring and Interpretation among nursing students. An evaluative research approach with one group pretest posttest design was adopted. A sample size of MSc Nursing 1st year students were selected using convenient sampling technique. Educational package consisted of demographic proforma, structured knowledge questionnaire on ECG monitoring and interpretation and tool to assess skill in ECG interpretation. Findings of their study revealed that majority 23(57.5%) had poor skill in interpreting ECG during pretest whereas majority 36(90%) had achieved good skill in interpreting ECG after posttest. It was found that that there was significant association between the knowledge and the skill of nursing students of nursing students on ECG monitoring with areas of work .

Spiva et al (2012) conducted a study to assess the effectiveness of nurse's ability to interpret basic electrocardiogram strips accurately using different learning modalities. The method used for the study is a descriptive pre-/post-test method was used to determine the effectiveness of alternative teaching modalities on nurses' knowledge and confidence in electrocardiogram (EKG) interpretation. A convenience sample of 135 nurses was recruited in an integrated health care system in the South-eastern United States. Instruments included a confidence scale, an online EKG test, and a course evaluation. The results of the study indicated that there is a statistically significant difference in knowledge and confidence were found for individual groups after nurses participated in the intervention. Statistically significant differences were found in pre-knowledge and post-confidence when groups were compared.

The fourth objective of the study was to find out association between the mean differed level of knowledge and arrhythmia interpretation score with selected demographic variables of staff nurse.

The table 4.8 shows the association between the mean differed levels of knowledge with selected demographic variables of staff nurse. The study findings reveals that there was statistically significant association was found between the mean differed level of knowledge on arrhythmia with the demographic variable age (χ^2=5.51, p=0.02) at p<0.05 level.

The findings revealed that staff nurses aged between 24 – 26 years gained more knowledge on arrhythmia.

Hence the NH_3 stated earlier that **"There is no significant association of mean differed level of knowledge and Arrhythmia Interpretation of staff nurses with their selected demographic variables"** at p>0.05 was not accepted for the demographic variable age with mean differed level of knowledge and accepted for other demographic variable.

The table 4.9 shows the association between the mean differed levels of arrhythmia interpretation skill with selected demographic variables of staff nurse. The study findings reveals that there was no statistically significant association was found between the mean differed level of arrhythmia interpretation skill with the demographic variables at p<0.05 level.

Pettinger et al (1993) conducted a descriptive survey on paediatric critical care nurses' knowledge of cardiac dysrhythmias. They correlated knowledge level with demographic variables (education, nursing experience, certification, supplemental training, and area of employment and geographic region of residence).The study was conducted in American Association of Critical-Care Nurses' 19 geographic regions of the United States. Intervention consisted of a criterion-referenced, self-administered test regarding paediatric dysrhythmias was administered to a sample size of 1000 paediatric critical care nurses. Study results revealed that there is a significant association between mean total test score and with demographic variables. They concluded that nurses overall knowledge of dysrhythmias was low and recommended continuing education programs for paediatric critical care nurses.

SUMMARY,

CONCLUSION,

IMPLICATION,

RECOMMENDATION

AND LIMITATION

CHAPTER – 6

SUMMARY, CONCLUSION, IMPLICATION, RECOMMENDATION AND LIMITATION

This chapter deals with the summary, conclusion, limitation and implications for nursing practice, nursing education, nursing administration and recommendations for further nursing research.

6.1 SUMMARY

Worldwide, cardiovascular disease is estimated to be the leading cause of death in the world by 2020 (Murray CJL, Lopes AD, eds: The global burden of diseases) Electrocardiography (ECG) continues to be the most commonly used laboratory procedure for the diagnosis of heart disease. About 40% of sudden death victims have cardiac arrest as the first manifestation of coronary artery disease. This emphasized that the nurses have significant diagnostic influence in the areas of cardiac rhythm monitoring and dysrhythmia identification. Hence this study was undertaken to **assess the effectiveness of Arrhythmia Interpretation Training (AIT) programme on knowledge and arrhythmia interpretation among staff nurses at a hospital in Chennai.**

An evaluative approach was undertaken to evaluate the effectiveness of Arrhythmia Interpretation Training Programme among staff nurses working Madras Medical Mission hospital, Mogappair during the year 2014-2015. A sample of 50 staff nurses were selected using purposive sampling method. Conceptual framework of the General system theory by Ludwig Von Bertalanffy has been utilized for the study.

Objectives:

1. To assess the pre and post-test level of knowledge and Arrhythmia Interpretations among the staff nurses.
2. To correlate post test knowledge and Arrhythmia Interpretation of staff nurses.
3. To assess the effectiveness of Arrhythmia Interpretation Training (AIT) programme on knowledge and arrhythmia interpretation among staff nurses.

4. To associate the mean differed level of knowledge and arrhythmia interpretation score with selected demographic variables of staff nurse.

The Null Hypotheses formulated were:

NH_1: There is no significant relationship between the knowledge and arrhythmia interpretation among the staff nurses.

NH_2: There is no significant difference in the pre and post-test levels of knowledge and arrhythmia interpretation.

NH_3: There is no significant association of mean differed level of knowledge and Arrhythmia Interpretation of staff nurses with their selected demographic variables.

The assumptions were:

1. The staff nurse involved in the study will have basic knowledge on anatomy and physiology of human heart.
2. Staff nurses have basic knowledge about electrocardiogram.
3. Staff nurses need to be aware of the abnormal cardiac rhythms.
4. Staff nurses needs to periodically update their knowledge and skill on arrhythmia interpretation through special training programme.

The review of literature was derived from primary and secondary sources along with professional experience and expert's guidance in the field of Medical Surgical Nursing. This provided a strong foundation for the selection of the problem and also strengthened the ideas for conceptual framework, aided to design the methodology and develop the tool for data collection.

The conceptual framework adopted for the study was based on Modified Ludwig Von Bertalanffy System Model (1968). General system theory serves as a model for viewing people as interacting within environment. According to this theory a system is a group of elements that interact with one another in order to achieve the goal. An individual is a system and receives input from environment. Thus helps the system to determine goals.

Research Methodology

A pre-experimental one group pretest – post test design was used. The study was conducted at Madras Medical Mission Hospital. 50 samples were selected using purposive sampling technique. Structured self-administered questionnaire was used to assess the knowledge on Arrhythmia and Rhythm Quiz was used to assess the Arrhythmia Interpretation. Immediately after the pretest, arrhythmia interpretation training programme was conducted in three consecutive days. The post test was conducted after 1 week of the training programme. The collected data was analyzed using both descriptive and inferential statistics.

Findings of the study

The data analysis showed following main findings:

- The collected data was analysed by using descriptive and inferential statistics. Interpretation and discussion was done based on the objectives of the study, null hypotheses, conceptual framework and research studies from literature review.
- The overall pre-test level of knowledge revealed that 37(74%) of them had inadequate knowledge and 13(26%) had moderately adequate knowledge and none of them had adequate knowledge.
- The overall post-test level of knowledge revealed that 41(82%) had moderately adequate knowledge and 9(18%) had inadequate knowledge and none of them had adequate knowledge.
- Regarding pre-test Arrhythmia interpretation skill, all the staff nurses 50(100%) were having inadequate level of Arrhythmia interpretation. While in the post test, nearly 14(28%) had a moderately adequate interpretation skill and 36(72%) had inadequate level of Arrhythmia interpretation skill.
- The post-test mean score of knowledge was 17.60 ±1.80 and post-test mean score of arrhythmia interpretation was 7.00±0.85. The calculated value of Karl Pearson's correlation(r) = 0.237 shows a positive correlation between post-test knowledge and Arrhythmia interpretation level but not found to be statistically significant.
- The mean knowledge score in pre-test was 15 with S.D 1.81 and the mean knowledge score in post-test was 17.60 with S.D 1.80. The calculated' value

was t = 8.67 which was more than the table value and was found to be statistically highly significant at $p<0.05$ level.

- The mean Arrhythmia interpretation score in pretest was 5.4 with S.D 1.34 and the mean Arrhythmia interpretation score in post test was 7.0 with S.D 0.85. The calculated 't' value was t = 11.24 which was more than the table value and was found to be statistically highly significant at $p<0.05$ level.
- Statistically significant association was found between the mean differed level of knowledge on arrhythmia with the demographic variable age ($\chi 2=5.51$, $p=0.02$) at $p<0.05$ level.

6.2 CONCLUSION

The interactive Arrhythmia Interpretation Training Programme, the educational program used in this research was effective in increasing nurse's knowledge about Arrhythmia and Arrhythmia Interpretation skill. The unit-based collaborative learning activities and competency skills validation helped reinforce the content of the educational program. In order to improve patient outcomes, this type of program may be more effective if it were to involve all of the staff members on the unit who are responsible for applying electrodes and selecting the monitoring leads. More research is needed to establish to improve the effectiveness of the program in improving patient outcomes when all staff are included and if additional strategies are used, such as unit champions and group rewards.

6.3 NURSING IMPLICATION

6.3.1 Nursing Practice

- Staff nurses must be competent and could earn credit points towards their Clinical Practice Developmental Program thereby professional development.
- The nursing manager or unit educator could be responsible for updating the policy.
- Expand the training on dysrhythmia monitoring practices at the appropriate level for all staff nurses. Units that should be included are telemetry units, intensive care units, progressive care units, emergency departments, and anywhere else that cardiac monitoring is performed.

6.3.2 Nursing Education

- Nurse educators should incorporate the importance of Arrhythmia Interpretation in the curriculum from second year nursing program.
- Nurse educators should develop the skill among nursing students on identifying normal sinus rhythms and arrhythmias.
- Nurse educator should encourage the students to organize educational programs to emphasize the importance of ECG interpretation.
- In-service education, refresher course and training programs on ECG Interpretation should be systematically planned and regularly conducted at various settings.
- All nurse educators for critical care areas should collaborate to develop and teach the courses.
- Continuing Nursing Education programme should be mandatory for all staff and enforced by nursing managers.
- For nurses, their dysrhythmia and monitoring education should include the following components

  - physiology of conduction system of heart
  - basics of ECG
  - types of arrhythmias
  - skin preparation,
  - electrode placement, lead selection,
  - hospital monitoring policies.

- For the nurses ‘education on the first component, a new interactive web-based learning module could be developed dysrhythmia class.
- Continuing education credit is an important incentive to some nurses, so it should continue to be offered.
- Another recommendation to improve participation of staff is to ask for volunteers from each job class and shift to be nurse leaders, who would motivate the staff and lead unit-based collaborative learning activities similar to ones that were done in this research project.
- The nurse educator or assistant nurse managers should validate the unit champion‘s skill competency and then determine if the champion may document other staffs ‘competency with the skills.

6.3.3 Nursing Administration

- Nurse administrator should remain updated with knowledge regarding arrhythmia and arrhythmia interpretation
- The nurse administrator should encourage and facilitate the staff nurses to update their knowledge regarding basics of ECG, arrhythmia and arrhythmia interpretation.
- Nurse Managers can strengthen interdisciplinary and multidisciplinary collaboration with researchers.
- The nurse administrator can organize conferences, continuing education programs, in-service education programs to introduce the needed changes coming up through ongoing scientific research regard ECG interpretation.
- If the unit shows an improvement towards meeting or exceeding the hospital average, incentives or rewards could be provided to the whole unit.
- If an employee is consistently not following the policy, the nursing manager should provide individual feedback and assist the nurse to develop an action plan for improvement.
- The graduate nurse as a novice to advanced beginner may need to be evaluated in critical thinking skills before enrolment of the arrhythmia class.
- For ongoing reinforcement, assistant nurse managers and educators should conduct periodic patient audits of electrode placement, lead selection, unanalysable tracings, and inappropriately silenced alarms.

6.3.4 Nursing Research

- The results of this study should only begin to guide educators when selecting teaching strategies for classroom and clinical learning.
- The findings of the present study serve as basis for other health care professionals and to the nursing students to conduct further studies and to find out the effectiveness of Arrhythmia Interpretation Training programme.
- The nurse scientist should communicate these findings to the public so as to enhance the ECG Interpretation Training programme for the staff nurses.
- The study implies that staff nurses education has a significant role in improving their knowledge regarding arrhythmia and arrhythmia interpretation in reducing the in-hospital co-morbidities.

- The development and expansion of problem-based learning curriculum for arrhythmia interpretation may enhance critical thinking, problem-solving, motivation, and recognition of learning needs for the staff nurse.
- Research should be expanded in relation to preference of learning styles and teaching strategies for registered nurses.

6.4 RECOMMENDATION

Based on the study findings, the following recommendations were made

1. A similar study could be done with other teaching strategies to identify the differences in their knowledge and arrhythmia interpretation skill.
2. Compare classroom & online methods for teaching nurses and nursing students on basics of ECG and advanced dysrhythmias.
3. The nurse researcher recommends the department of cardiology and nursing service of Madras Medical Mission hospital to utilize this study as a model and to conduct periodic in-service education programme on ECG interpretation.
4. The intervention tool can be utilized by the health care professional, nurse educators and clinical instructors in the future.

6.5 LIMITATION

There were several limitations to this study.

1. It was conducted with a very small sample size of nurses and results cannot be generalized to other groups.
2. Nurses were the only staff members who received the education and were included in the study.
3. Study only evaluated the monitoring practices of selected Arrhythmias which are more prominent in clinical areas.

6.6 COMMUNICATION OF FINDINGS

- The findings of the research will be disseminated through paper presentation either in conferences, workshops at the national and international level or will be published in specialty journal or research journals and articles.

6.7 UTILIZATION OF THE RESEARCH FINDINGS

- The findings of the research will be utilized in both the nursing education and nursing service.
- The nurse researcher recommends the department of cardiology and nursing service of Madras Medical Mission hospital to utilize this study for intensive ECG Training Programme for Staff Nurses .

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APPENDICES

APPENDIX - A

MMM COLLEGE OF NURSING
Learn to Serve
A Unit of
The Madras Medical Mission

MMMCON/R.S/03/2014 **31st October 2014**

To

Dr. Ajit Mullasari

Director – Cardiology

Madras Medical Mission

Chennai-37

Respected Sir,

Greetings from MMM College of Nursing!

Sub: Requesting for permission to conduct study among staff nurses-reg.,

This is to your kind notice that **Mr. Paul Joseph Ani,** is a bonafide student of MSc(N) IInd year of MMM College of Nursing. I kindly request you to permit his to conduct the study on **"Assessment of the effectiveness of Arrhythmia Interpretation Training programme (AIT) on knowledge regarding Arrhythmia & Arrhythmia Interpretation among staff nurses at selected hospital in Chennai"**. I assure that his study will not provide any risk to study subjects and we will abide to the rules & regulations of the hospital and the hospital activities will not be affected. Kindly consider the same and do the needful.

Note:

1. The above study was approved by ethical committee of The Madras Medical Mission Hospital

Thanking You

PRINCIPAL
MMM COLLEGE OF NURSING
No. 131, SAKTHI NAGAR,
NOLAMBUR,
CHENNAI - 600 095.

Copy to:

i. The Director Medical Administration
ii. The Director Administration
iii. The Nursing Superintendent

MMM College of Nursing
No. 131, Sakthi Nagar, Nolambur
Mogappair West, Chennai - 600 095
Phone: 044-26535001, 26535002
Fax: 044-26535003

Registered Office :
The Madras Medical Mission
No. 4A, Dr. J.J. Nagar, Mogappair,
Chennai - 600 037
Phone: 044-26565961, 26565991, 26561801

APPENDIX - B

INSTITUTIONAL ETHICS COMMITTEE
THE MADRAS MEDICAL MISSION
No. 4-A, Dr. J.J. NAGAR, MOGAPPAIR, CHENNAI - 600 037, INDIA
Call : + 91 - 44 - 26561801, 26565961, 26565991 Fax : 91 - 44 - 26565859
E-mail : icvddoctors@mmm.org.in Website : http://www.mmm.org.in

To

Date: 12 Jun 2015

Mr. Paul Joseph Ani
Madras Medical Mission,
Chennai 600037

EC Reg no: ECR/140/Inst/TN/2013

Ref: Assessment of the effectiveness of Arrhythmia Interpretation Training Programme (AIT) on knowledge and arrhythmia interpretation among staff nurses at a selected hospital in Chennai.
Sub: Ethics Committee approval of study document for the above mentioned study.

Dear Mr. Paul Joseph Ani

We have received from you 06+1 copies of each of following study related document submitted vide letter dated: 18 Jul 2014

1. Protocol Synopsis
2. Informed Consent Form

Upon submission of the validation certificate as requested by EC, the committee has decided to approve the above-mentioned document after due consideration in the meeting held on 23rd May 2015

The following members were present at the meeting held on 23 May 2015 at 9-30 AM at Mount Tabour Lounge, Madras Medical Mission.

Name & Qualification	Primary Scientific or Non scientific Specialty	Affiliation with the institution	Gender
Dr. M.S. Ramachandran, MBBS,MD,FRCP,FICP,DSC(HONS), Prof.Director medicine(Rtd)	Chairperson	No	M
Dr V M Kurian, MS, MCh, DPMR. Sr. Consultant cardiovascular Surgeon Madras Medical Mission	Member secretary	Yes	M
Dr Ajit Mullasari, MD DNB DM, Director of cardiology, Madras Medical Mission	Member Clinician	Yes	M

INSTITUTIONAL ETHICS COMMITTEE
THE MADRAS MEDICAL MISSION
No. 4-A, Dr. J.J. NAGAR, MOGAPPAIR, CHENNAI - 600 037, INDIA
Call : + 91 - 44 - 26561801, 26565961, 26565991 Fax : 91 - 44 - 26565859
E-mail : icvddoctors@mmm.org.in Website : http://www.mmm.org.in

Dr. Saravanan Sundararaj Director ILKOT, Madras Medical Mission. MBBS,FRCS	Member, Clinician	Yes	M
Dr. K.M Kundavi, MBBS., D.G.O.DNB.(OG) MNAMS, Senior Consultant, IRM, Madras Medical Mission	Member, Clinician	Yes	F
Dr. Suma Malini Victor, MBBS, DNB., Consultant Cardiologist, Madras Medical Mission	Member, Clinician	Yes	F
Dr. Chitrasree V, MBBS,DCP Coordinator, Consultant Lab services, Madras Medical Mission	Member, Basic Medical Scientist	Yes	F
Rev.Fr. Ninan Chacko, MA,DPS, Chaplain Theologist, ICVD, Madras Medical Mission	Non-Clinical Member Theologist/Layperson	Yes	M
Mr. Ravi Kumar Paul, LLB Paul & Paul B.A., B.L., Advocates Chennai.	Member Legal Expert	No	M
Dr. C.B Tharani, M.D. Pharmacology	Pharmacologist	No	F
Dr. Philomina Mariados, PhD(Sociology), Dean, College of Health Science, Madras Medical Mission	Member, Lay person	Yes	F

The Committee expects from the Principal Investigator to report the study on annual basis.

It was to be noted that neither you nor any of your proposed study team members were present during the decision-making procedures of the Ethics Committee.

Yours truly,

Signature: _____ **Date:** 12/06/2015

Name: Dr V M Kurian
Title: Member secretary

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE
MADRAS MEDICAL MISSION
No. 4 - A, Dr. J.J. NAGAR,
MOGAPPAIR, CHENNAI - 600 037.

APPENDIX - C

INFORMED CONSENT

I am giving consent to be a part of the study by Mr.Paul Joseph Ani, M.Sc. nursing student, Madras Medical Mission College of Nursing, Nolumbur, focuses on **"Effectiveness of Arrhythmia Interpretation Training programme (AIT) on knowledge and arrhythmia interpretation among staff nurses at a selected hospital in Chennai".** I hereby declare to follow the rules and regulations. I have been informed about the study and understood that the participation in the study will not cause any harm to me. I understood the benefits of the study. I have been informed that the participation in Arrhythmia Interpretation Training programme is entirely voluntary and I can refuse to answer to the questions or decide to terminate the interview at any point. I have also been informed that my participation or my refusal to answer will have no effect on my professional career in this hospital. I have been told that this will be used only for the study purpose and also informed about the confidentiality of my responses. So that, I……
……. (Name and Address) voluntarily agree to join in the study.

Signature of the Investigator **Signature of the Participant**

Date: **Date:**

APPENDIX - D

TOOL FOR DATA COLLECTION

PART 1- DEMOGRAPHIC DATA

1. Age in years
   a) 20-22
   b) 23-25
   c) 26-28

2. Gender
   a) Male
   b) Female

3. Education Level
   a) General Nursing
   b) B.Sc Nursing
   c) Post Basic Nursing

4. Total years of experience as a staff nurse:
   a) 1-5yrs
   b) 6-10yrs
   c) 11-15yrs

5. Work experience in cardiac Unit:
   a) 0-4 months
   b) 5-8 months
   c) 9-12 months

6. Have you attended any class on arrhythmia interpretation training programme;
   a) yes
   b) no

PART – II

SELF ADMINISTERED QUESTIONNAIRE TO ASSESS KNOWLEDGE ON PHYSIOLOGY OF CONDUCTION SYSTEM, BASICS OF ECG AND ARRHYTHMIA

(Kindly go through each question, choose the best answer and place a tick mark on the space provided. Each question carries a score of one)

1. The natural pacemaker of the heart is
   a) SA node ☐
   b) AV node ☐
   c) Bundle of His ☐
   d) Purkinje Fibers ☐

2. There is a delay in conduction of impulse at
   a) SA node ☐
   b) AV node ☐
   c) Bundle of His ☐
   d) Purkinje Fibers ☐

3 The properties of cardiac muscle are
   a) Excitability ☐
   b) Rhythmicity ☐
   c) Conductivity ☐
   d) All the above ☐

4. SA node generates impulses at a rate of
   a) 60 – 100 bpm ☐
   b) 80-100 bpm ☐
   c) 40-60 bpm ☐
   d) Above 100 bpm ☐

5. ECG gives information about all of the below except.

a) Myocardial Perfusion ☐
b) Electrical Properties ☐
c) Mechanical Properties ☐
d) Rhythm ☐

6. The T wave represents

a) Ventricular repolarization ☐
b) Ventricular depolarization ☐
c) Atrial repolarization ☐
d) Atrial depolarization ☐

7. The normal PR interval is

a) 0.20 seconds ☐
b) 0.30 seconds ☐
c) 0.40 seconds ☐
d) 0.50 seconds ☐

8. The normal duration of QRS complex is

a) 0.10 second or less ☐
b) 0.20 seconds ☐
c) 0.30 seconds ☐
d) 0.40 seconds ☐

9. Arrhythmia is

a) A structural abnormality ☐
b) A disturbance or loss of rhythm ☐
c) Abnormal heart sound ☐
d) Valvular defect ☐

10. Cardiac arrhythmia results from abnormal impulse

a) Initiation ☐
b) Conduction ☐
c) Both a & b ☐
d) a or b ☐

11. The common causes for sinus tachycardia is

a) Hyperthyroidism ☐
b) Hypothyroidism ☐
c) Hyperglycemia ☐
d) Hypoxia ☐

12. The condition in which the rhythm is normal and the rate is less than 60 beats per minute

a) Sinus bradycardia ☐
b) Sinus tachycardia ☐
c) Atrial flutter ☐
d) Ventricular fibrillation ☐

13. The type of arrhythmia which is associated with phases of respiration

a) Sinus arrest ☐
b) Sinus arrhythmia ☐
c) Atrial flutter ☐
d) Atrial fibrillation ☐

14. Impulses originating from ectopic focus other than sinus node results in

a) Premature atrial complexes ☐
b) Atrial flutter ☐
c) Sinus tachycardia ☐
d) Ventricular tachycardia ☐

15. Sawtooth – shaped waves in ECG is a characteristic feature of

a) Atrial flutter ☐
b) Atrial fibrillation ☐
c) Ventricular fibrillation ☐
d) Ventricular flutter ☐

16. Most common cardiac arrhythmia among patient with cardiac disease is

a) Atrial fibrillation ☐
b) Sinus arrhythmia ☐
c) Sinus arrest ☐
d) Junctional arrhythmia ☐

17. Ventricular fibrillation is common among the victims of

a) Drowning ☐
b) Electrical shock ☐
c) Burns ☐
d) Poisoning ☐

18. Clinical manifestation of ventricular fibrillation includes

a) Unresponsiveness ☐
b) Pulselessness ☐
c) Apnea ☐
d) All the above ☐

19. Supra ventricular tachycardia includes

a) Sinus tachycardia ☐
b) Atrial flutter ☐
c) Atrial fibrillation ☐
d) All the above ☐

20. Non pharmacological measures to treat supra ventricular tachycardia is

a) Coughing ☐
b) Cardio version ☐
c) Valsalva maneuver ☐
d) Both a & c ☐

21. The differentiating characteristics of supra ventricular tachycardia are

a) Narrow QRS complex ☐
b) P wave hidden ☐
c) Both a & b ☐
d) A or b ☐

22. The drug of choice used to treat symptomatic bradycardia is

a) Digoxin ☐
b) Digitalis ☐
c) Atropine ☐
d) Lidocaine ☐

23. The most effective treatment for ventricular fibrillation and ventricular tachycardia is

a) Defibrillation ☐
b) Cardio version ☐
c) Both a & b ☐
d) Atropine ☐

24. Synchronized cardio version is preferred for treating

a) Supraventricular tachycardia ☐
b) Ventricular tachycardia ☐
c) Both a & b ☐
d) A or b ☐

25. The group of drugs used to control heart rate

a) Calcium channel blocker ☐
b) Beta blocker ☐
c) Both a & b ☐
d) A or b ☐

26. The differentiating characteristics of ventricular tachycardia is

a) Wide QRS complex ☐
b) No consistent p wave ☐
c) Both a & b ☐
d) A or b ☐

27. The most efficient electrical excitation and mechanical contraction unit of a tissue is found in

a) Retina ☐
b) Grey matter cell ☐
c) Myocardium ☐
d) Islets of langerhans ☐

28. The contraction of myocardium is most represented by

a) R wave ☐
b) S wave ☐
c) QRS ☐
d) QRS and ST Segment ☐

29. PR segment Represents

a) Conduction time from SA node to AV node ☐
b) Conduction time SA node to Ventricular Myocardium ☐
c) 1^{st} half of Ventricular depolarization ☐
d) Atrial Repolarization ☐

30. Clinical Signs of symptomatic bradycardia is.

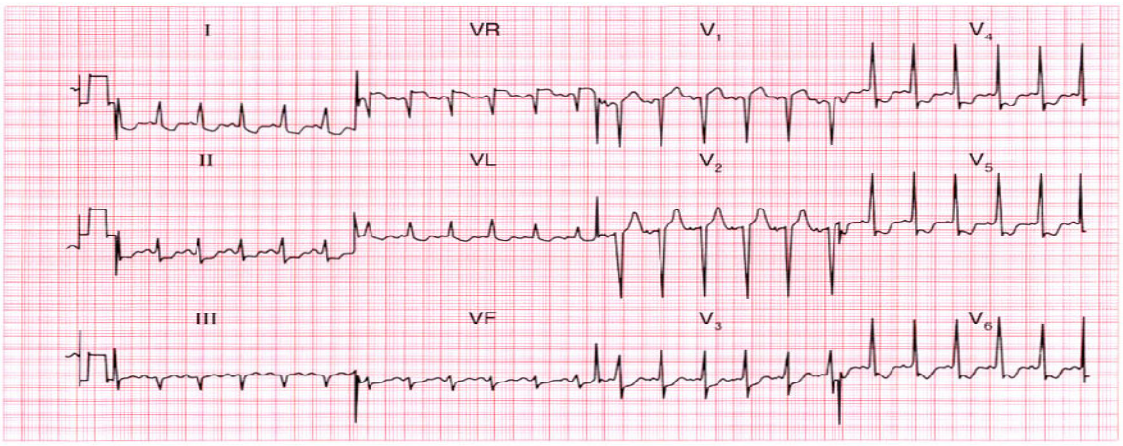
a) Hypotension ☐
b) Syncope ☐
c) Dyspnea ☐
d) All the above ☐

PART – III

RHYTHM QUIZ BOOKLET

(FOR ASSESSING ARRHYTHMIA INTERPRETATION SKILL)

1. This ECG was recorded in the A & E department from a 55-year-old man who had had chest pain at rest for 6 h. There were no abnormal physical findings. What does the trace show ?



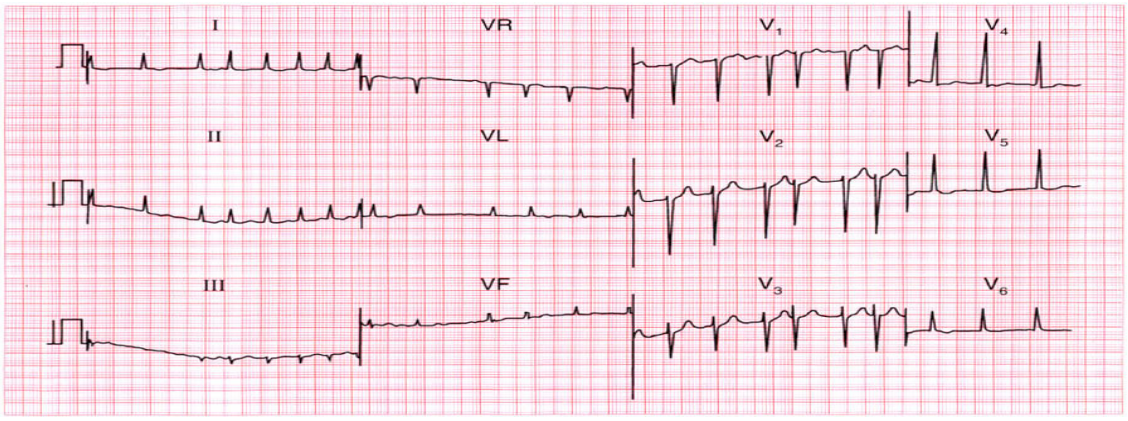
a. Atrial flutter ☐

b. Atrial fibrillation ☐

c. Ventricular fibrillation ☐

d. Ventricular flutter ☐

2. This ECG was recorded from a 60-year-old man being treated as an out-patient for severe congestive cardiac failure. What might be the diagnosis of the underlying heart condition?



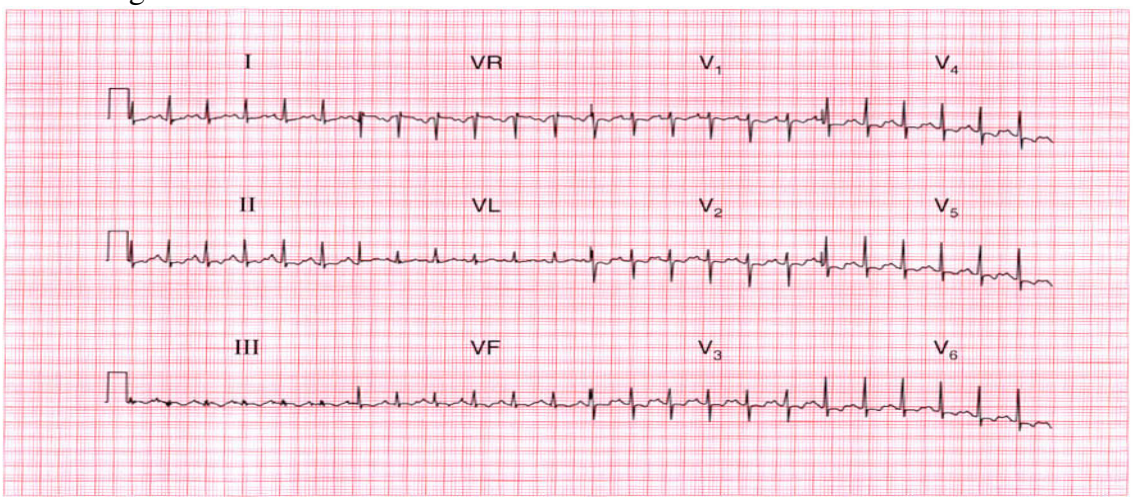
a. Ventricular fibrillation ☐

b. Atrial flutter ☐

c. Ventricular flutter ☐

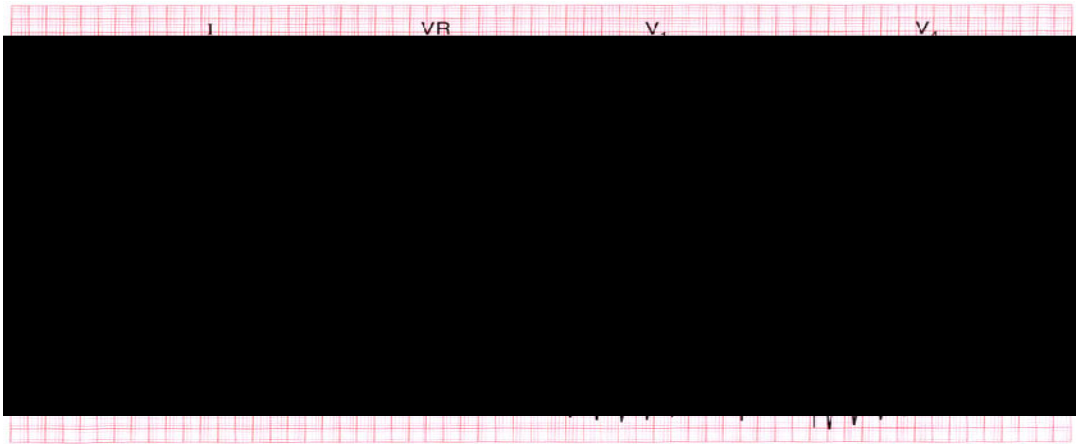
d. Atrial fibrillation ☐

3. This EGG was recorded from a 39-year-old woman who complained of a sudden onset of breathlessness. She had no previous history, and no chest pain. Examination reveals nothing other than a rapid heart rate. What is the diagnosis?



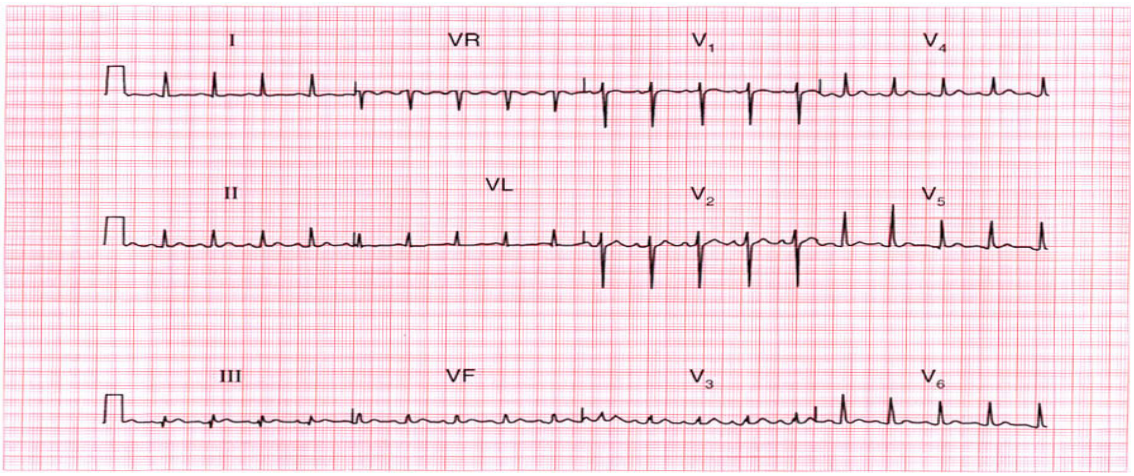
a. Sinus bradycardia ☐
b. Sinus tachycardia ☐
c. Junctional arrhythmia ☐
d. Sinus arrest ☐

4. This EGG was recorded in a coronary care unit from a patient admitted 2 h previously with an acute anterior myocardial infarction. The patient was cold and clammy, and confused, and his blood pressure was unrecordable. What does the ECG show?



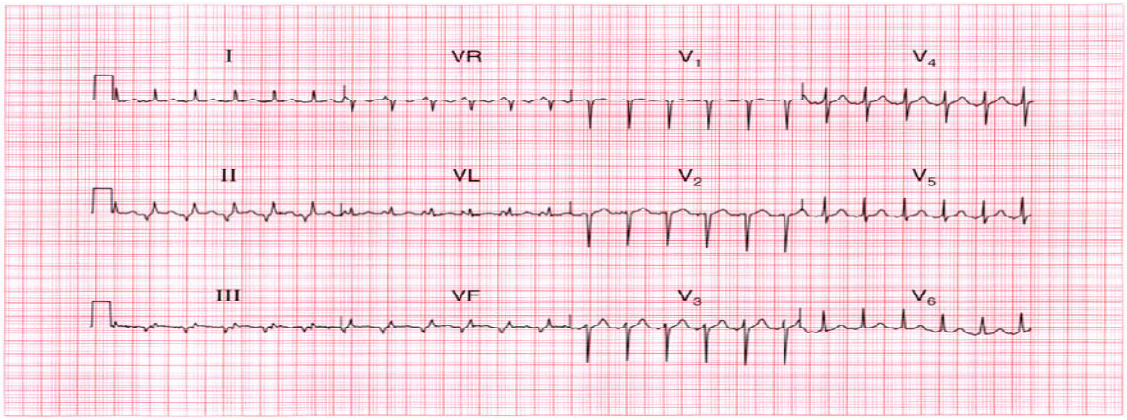
a. Atrial flutter ☐
b. Ventricular tachycardia ☐
c. Ventricular flutter ☐
d. Supraventricular tachycardia ☐

5. This ECG was recorded from *a* 30-year-old woman who complained of palpitations. Identify the rhythm?



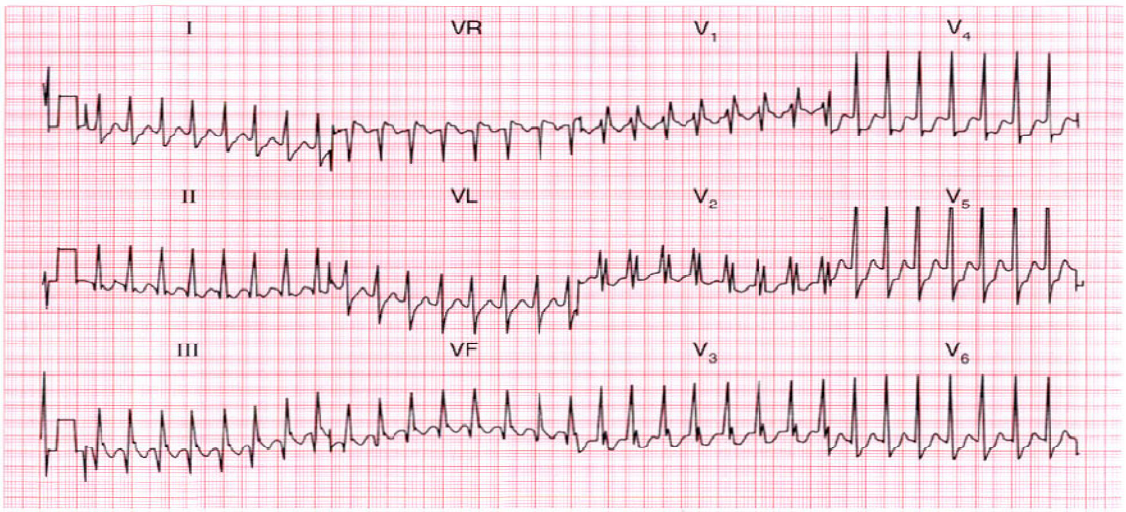
a. Sinus arrest ☐
b. Sinus tachycardia ☐
c. Sinus bradycardia ☐
d. Sinus arrhythmia ☐

6. A 30-year-old man, who had complained of palpitations for many years without anything abnormal being found, came to the A & E department during an attack, and this ECG was recorded. Apart from signs of marked anxiety there was nothing to find except a heart rate of 140/min. What does the ECG show?



a. Atrial tachycardia ☐
b. Atrial flutter ☐
c. Atrial fibrillation ☐
d. Ventricular tachycardia ☐

7. A 25-year-old man, known to have an atrial septal defect, was admitted to hospital as an emergency because of palpitations. His heart rate was 170/min, his blood pressure was 140/80 and there were no signs of heart failure. What is the cardiac rhythm?



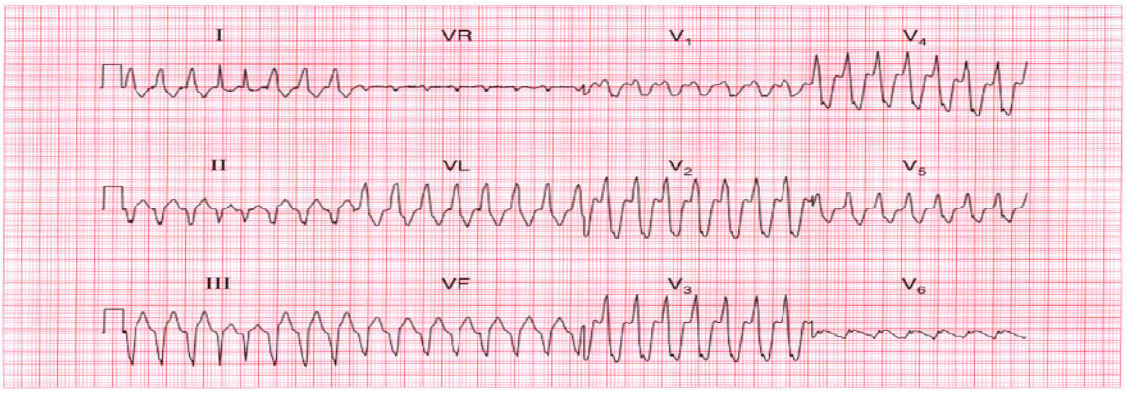
a. Atrial flutter ☐

b. Ventricular tachycardia ☐

c. Atrial fibrillation ☐

d. Supra ventricular tachycardia ☐

8. A 70-year-old woman, admitted to hospital because of increasing heart failure of uncertain cause, collapsed and was found to have a very rapid pulse and a low blood pressure. This is her ECG. She recovered spontaneously. What is this rhythm ?



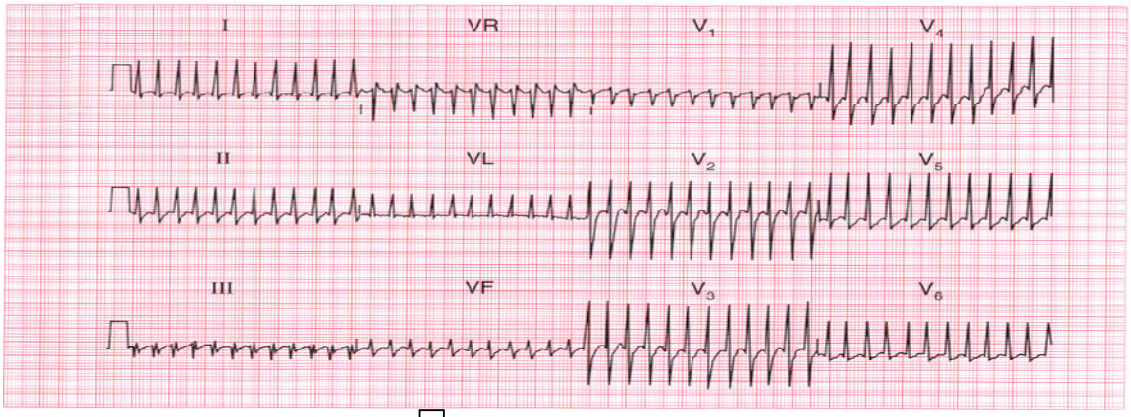
a. Ventricular flutter ☐

b. Supra ventricular tachycardia ☐

c. Ventricular tachycardia ☐

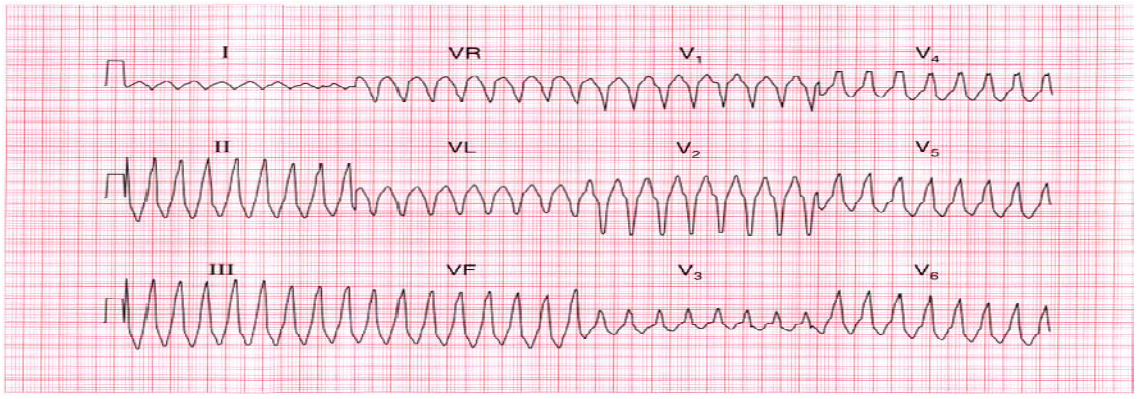
d. Atrial flutter ☐

9. A 50-year-old man, who had complained of attacks of dizziness and palpitations for several years, collapsed at work and was brought to the A & E department. He was cold and clammy. His heart rate was rapid and his blood pressure was unrecordable. There were signs of left ventricular failure. This is his ECG. What does it show ?



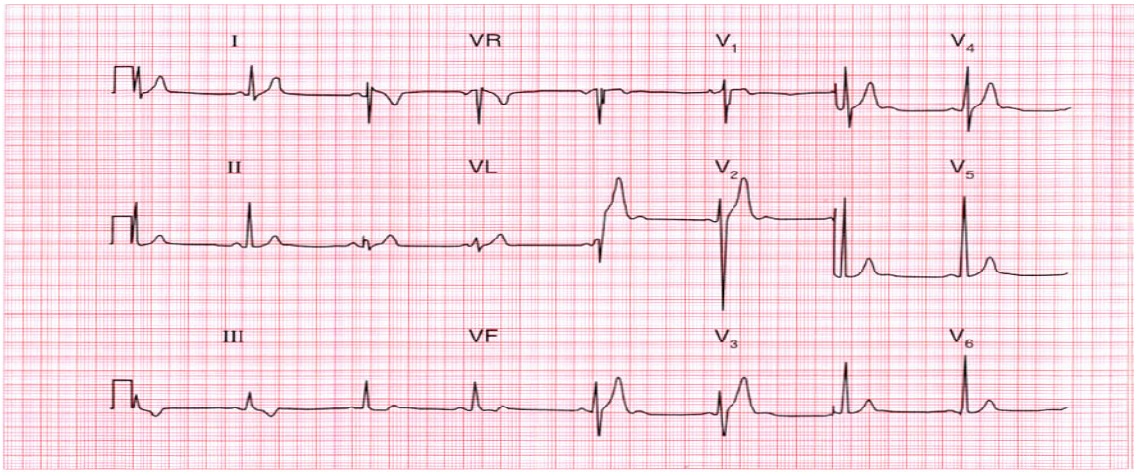
a. Atrial fibrillation ☐
b. Atrial flutter ☐
c. Ventricular tachycardia ☐
d. Ventricular fibrillation ☐

10. A 30-year-old man, who had had attacks of palpitations for several years, was seen during an attack, and this ECG was recorded. He was breathless and his blood pressure was unrecordable. What does the ECG show?



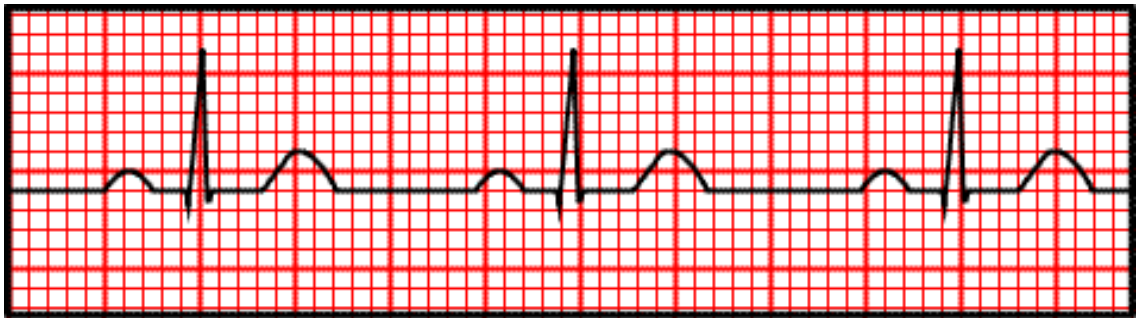
a. Supra ventricular tachycardia ☐
b. Ventricular flutter ☐
c. Atrial flutter ☐
d. Ventricular tachycardia ☐

11. This ECG was recorded from a 30-year-old man as part of a private 'health screening' examination. He was asymptomatic. Identify the rhythm?



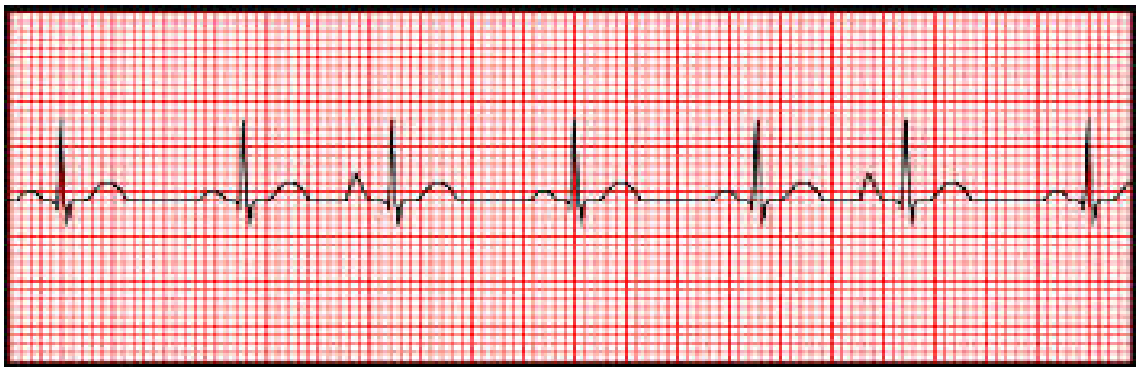
a. Sinus tachycardia ☐
b. Sinus rhythm ☐
c. Sinus bradycardia ☐
d. Sinus arrhythmia ☐

12. **Identify the rhythm**



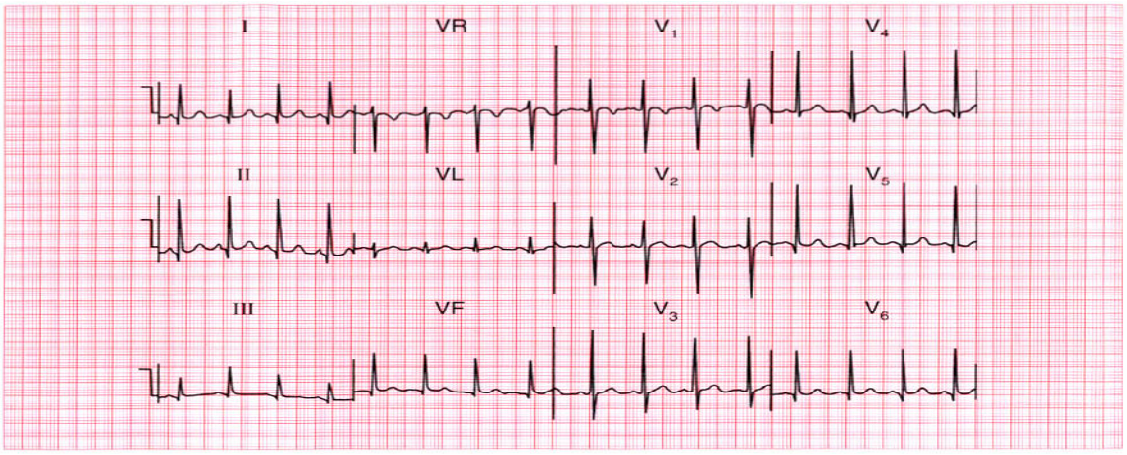
a. sinus bradycardia
b. sinus tachycardia
c. atrial flutter
d. ventricular fibrillation

13. Identify the rhythm



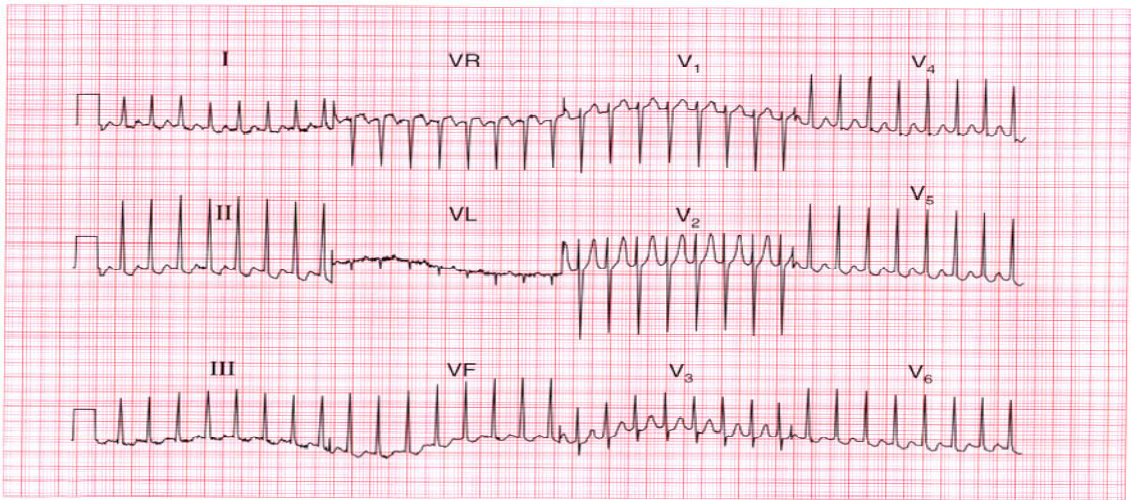
a. Ventricular Flutter ☐
b. Premature atrial Complexes ☐
c. Atrial Fibrillation ☐
d. Premature Ventricular Complexes ☐

14. This ECG was recorded from a 9-year-old girl who was asymptomatic but who had been found to have a heart murmur at a school medical examination. What does it tell you about the murmur?



a. Normal ECG ☐
b. Sinus bradycardia ☐
c. Sinus arrhythmia ☐
d. Septal defect ☐

15. A 45-year-old woman had complained of occasional attacks of palpitations for 20 years, and eventually this EGG was recorded during an attack. What are the palpitations due to?



a. Atrial flutter ☐

b. Supra ventricular tachycardia ☐

c. Atrial fibrillation ☐

d. Ventricular tachycardia ☐

ANSWER KEYS

For Knowledge:

1	a	16	a
2	b	17	b
3	b	18	d
4	a	19	d
5	c	20	d
6	a	21	c
7	a	22	c
8	a	23	c
9	b	24	c
10	c	25	c
11	a	26	c
12	a	27	c
13	b	28	c
14	a	29	b
15	a	30	b

For Arrhythmia Interpretation:

1	a	11	b
2	d	12	a
3	b	13	b
4	b	14	a
5	b	15	b
6	a		
7	d		
8	b		
9	b		
10	d		

APPENDIX – E

PLANNED EDUCATIONAL PROGRAMME ON ECG BASICS AND ARRHYTHMIA INTERPRETATION

LESSON PLAN

TOPIC	:	ECG BASICS AND ARRHYTHMIA INTERPRETATION
NAME OF THE TEACHER	:	MR. PAUL JOSEPH ANI
PREVIOUS KNOWLEDGE OF SAMPLES	:	NIL
GROUP	:	STAFF NURSES
METHOD OF TEACHING	:	LECTURE CUM DISCUSSION
NUMBER OF SAMPLES	:	50
AV AIDS	:	POWER POINT PRESENTATION, ECG BOOKLET, ECG STRIPS
DATE	:	11.02.2015 – 13.02.2015
VENUE	:	MADRAS MEDICAL MISSION HOSPITAL
DURATION	:	7½ HOURS

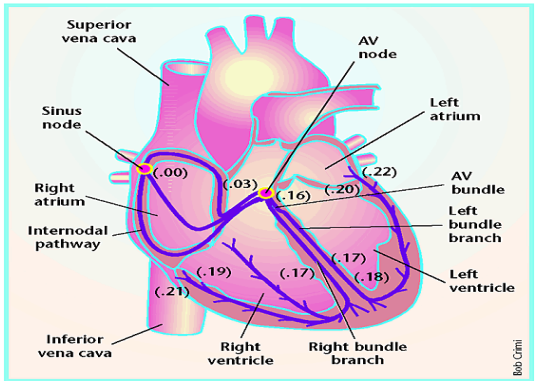
GENERAL OBJECTIVES:

At the end of the Structured Teaching Program the sample will acquire in-depth knowledge regarding Arrhythmia Interpretation and acquire a desirable attitude and skill in applying the same in clinical situation.

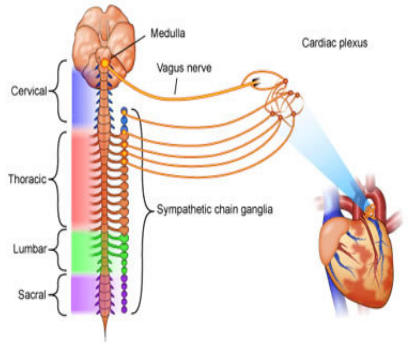
SPECIFIC OBJECTIVE:

At the end of the STP the samples will be able to

1. Explain the normal physiology of conduction system of heart
2. Define electrocardiogram
3. Recall the leads and planes
4. Enumerate the types of ECG monitoring
5. Describe the waveform or deflection in ECG
6. Recall 8 steps in ECG interpretation
7. Define the normal sinus rhythm
8. Define Dysrhythmias
9. List out the types of dysrhythmias
10. Enumerate the etiology of arrhythmia
11. Enlist the clinical features of arrhythmia
12. Define sinus arrhythmia
13. Define atrial arrhythmia
14. Explain ventricular dysrhythmias
15. Discuss the management of dysrhythmias
16. Discuss the nursing management

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
1	1 hr	The group should be able to explain the physiology of conduction system of heart.	**REVIEW OF RELATED ANATOMY AND PHYSIOLOGY NORMAL ELECTRICAL CONDUCTION**  • The electrical impulse that stimulates and paces the cardiac muscle normally originates in the sinus node (SA node), an area located near the opening of superior vena cava in the right atrium. • The electrical impulse occurs at a rate ranging between 60 and 100 times a minute in the adult. • The electrical impulse quickly travels from the sinus node through the atria to the atrioventricular (AV) node through intermodal pathway.	PowerPoint presentation	Lecture cum Discussion, Clarifying doubts	Listening Asking doubts, Taking notes	What are the components of conduction system of heart?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• The electrical stimulation of the muscle cells of the atria causes them to contract. • The structure of the AV node slows the electrical impulse, which allows time for the atria to contract and fill the ventricles with blood before the electrical impulse travels very quickly through the bundle of His to the right and left bundle branches and the Purkinje fibers, located in the ventricular muscle. • The electrical stimulation of the muscle cells of the ventricles, in turn, causes the mechanical contraction of the ventricles (systole). The cells repolarize and the ventricles then relax (diastole). • The process from sinus node electrical impulse generation through ventricular repolarization completes the electromechanical circuit, and the cycle begins again. • Sinus rhythm promotes cardiovascular circulation. The electrical impulse causes (and, therefore, is followed by) the mechanical contraction of the heart muscle.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• The electrical stimulation is called depolarization; the mechanical contraction is called systole. • Electrical relaxation is called repolarization and mechanical relaxation is called diastole.				
2	1 hr	The group should able to describe the factors that influences heart rate and contractility	**INFLUENCES ON HEART RATE AND CONTRACTILITY**  • The heart rate is influenced by the autonomic nervous system, which consists of sympathetic and parasympathetic fibers. • Sympathetic nerve fibers (also referred to as adrenergic fibers) are attached to the heart and arteries as well as several other areas in the body. • Stimulation of the sympathetic system increases heart	PowerPoint presentation	Lecture cum Discussion, Explaining	Listening, Taking notes	What are the factors that influence heart rate and contractility?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			rate (positive chronotropy), conduction through the AV node(positive dromotropy), and the force of myocardial contraction (positive inotropy). Sympathetic stimulation also constricts peripheral blood vessels, therefore increasing blood pressure. • Parasympathetic nerve fibers are also attached to the heart and arteries. Parasympathetic stimulation reduces the heart rate (negative chronotropy), AV conduction (negative dromotropy), andthe force of atrial myocardial contraction. • The decreased sympathetic stimulation results in dilation of arteries, thereby lowering blood pressure. Manipulation of the autonomic nervous system may increase or decrease the incidence of dysrhythmias. • Increased sympathetic stimulation—caused, for example, by exercise, anxiety, fever, or administration of catecholamines (e.g., dopamine [Intropin], aminophylline, dobutamine [Dobutrex])—may increase the incidence of dysrhythmias. Decreased sympathetic stimulation (e.g., with rest, anxiety-				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			reduction methods such as therapeutic communication or prayer, administration of beta-adrenergic blocking agents) may decrease the incidence of dysrhythmias.				
3	2Min	The group should be able to define ECG	**ECG** • An ECG is a series of waves and deflections recording the heart's electrical activity from a certain "view." • The electrocardiogram (ECG) provides a graphic depiction of the electrical forces generated by the heart. The ECG graph appears as a series of deflections and waves produced by each cardiac cycle. An ECG shows the precise sequence of electrical events occurring in the cardiac cells throughout that process. • The heart's electrical activity produces currents that radiate through the surrounding tissue to the skin. When electrodes are Attached to the skin, they sense those electrical currents and transmit them to an ECG monitor. The currents are then transformed into waveforms that represent the heart's depolarization repolarization cycle.	PowerPoint presentation	Lecture cum Discussion	Listening, Asking doubts	What is ECG?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
4	5Min	The group should be able to describe the Leads and Planes of ECG	**LEADS AND PLANES** Electrodes placed on the skin measure the direction of electrical current discharged by the heart. That current is then transformed into waveforms. An ECG records information about those waveforms from different views or perspectives. Those perspectives are called leads and planes. **The lead** A pair of electrodes, that consists of a positive and negative electrode constitutes an electrocardiographic lead. A lead provides a view of the heart's electrical activity between one positive pole and one negative pole. Between the two poles lies an imaginary line representing the lead's axis, a term that refers to the direction of the current moving through the heart. The direction of the current affects the direction in which the waveform points on an ECG. When no electrical activity occurs or the activity is too weak to measure, the waveform looks like a straight line, called an isoelectric waveform.	PowerPoint presentation	Lecture cum Discussion, Explaining, Clarifying doubts	Listening, Asking doubts	Describe the leads and planes of ECG?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			A plane Refers to a cross-section view of the electrical activity of the heart. • Frontal plane, a vertical cut through the middle of the heart, provides an anterior-posterior view. • Horizontal plane, a transverse cut through the middle of the heart, provides a superior or inferior view.				
5	30Min	The group should be able to describe the 12-Lead ECG	**12-LEAD ECG** 12 ECG leads are : • Limb leads • Chest leads **SIX LIMB LEADS OR EXTREMITY LEADS** Provide information about the heart's frontal (vertical) plane. An electrode is placed on each of the three limbs namely right arm, left arm, and left leg. The right leg electrode acts as a grounding electrode.	PowerPoint presentation	Lecture cum Discussion, Explaining, Clarifying doubts	Listening, Taking notes	What are the components of 12 lead ECG

<table>
<tr><th>S.No.</th><th>Time</th><th>Specific Objective</th><th>Content</th><th>A.V Aids</th><th>Teaching Activity</th><th>Learning Activity</th><th>Evaluation</th></tr>
<tr><td></td><td></td><td></td><td>
The standard limb leads
Standard limb leads obtain a graph of the electrical forces as recorded between two limbs at a time. therefore also called bipolar leads. Bipolar leads require a negative and positive electrode for monitoring.
Three standard limb leads- leads I, II, and III

Leads I, II, and III
Leads I, II, and III typically produce positive deflection on ECG tracings.
Lead I helps monitor atrial arrhythmias and hemi blocks.
Lead II commonly aids in routine monitoring and detecting of sinus node and atrial arrhythmias.

Lead III helps detect changes associated with inferior wall myocardial infarction
<table>
<tr><th>LEAD</th><th>POSITIVE ELECTRODE</th><th>NEGATIVE ELECTRODE</th></tr>
<tr><td>I</td><td>LA</td><td>RA</td></tr>
<tr><td>II</td><td>LL</td><td>RA</td></tr>
<tr><td>III</td><td>LL</td><td>LA</td></tr>
</table>
</td><td></td><td></td><td></td><td></td></tr>
</table>

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Augmented limb leads(unipolar leads) Unipolar record information from one lead from one limb at a time and require only one electrode. 3 in number. aVR –right arm aVL- left arm aVF – left foot Lead aVR provides no specific view of the heart. Lead aVLshows electrical activity coming from the heart's lateral wall. Lead aVF shows electrical activity coming from the heart's inferior wall. **PRECORDIAL LEADS(CHEST LEADS)** The six precordial leads (leads V1 through V6) provide information about the heart's horizontal plane. **• Lead V1** ➢ Biphasic ➢ Distinguishes between right and left ventricular ectopic beats				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			➢ Monitors ventricular arrhythmias, ST-segment changes, and bundle-branch blocks **• Leads V2 and V3** ➢ Biphasic ➢ Monitors ST-segment elevation **• Lead V4** ➢ Produces a biphasic waveform ➢ Monitors ST-segment and T-wave changes **• Lead V5** ➢ Produces a positive deflection on the ECG ➢ Monitors ST-segment or T-wave changes (whenused with lead V4) **• Lead V6** ➢ Produces a positive deflection on the ECG ➢ Detects bundle-branch blocks **Lead V1—**The precordial lead V1 electrode is placed on the right side of the sternum at the fourth intercostal rib space. This lead corresponds to the modified chest lead				

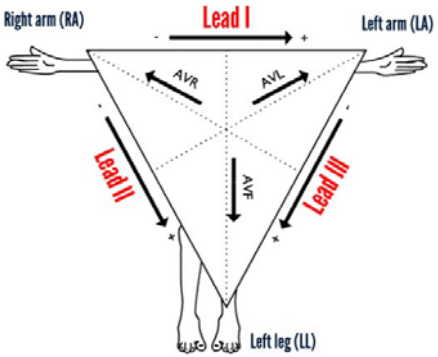
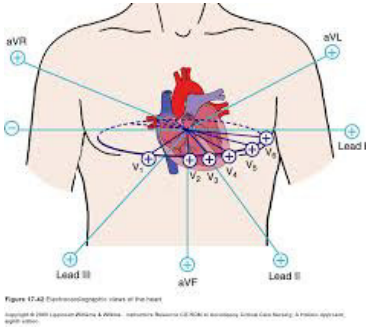
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			MCL1 and shows the P wave, QRS complex, and ST segment particularly well. It helps to distinguish between right and left ventricular ectopic beats that result from myocardial irritation or other cardiac stimulation outside the normal conduction system. Lead V1 is also useful in monitoring ventricular arrhythmias, ST-segment changes, and bundle-branch blocks. **Lead V2—**Lead V2 is placed at the left of the sternum at the fourth intercostal rib space. **Lead V3—**Lead V3 goes between V2 and V4. Leads V1, V2, and V3 are biphasic, with both positive and negative deflections. Leads V2 and V3 can be used to detect ST-segment elevation. **Lead V4—**Lead V4 is placed at the fifth intercostal space at the midclavicular line and produces a biphasic waveform. **Lead V5—**Lead V5 is placed at the fifth intercostal space				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			at the anterior axillary line. It produces a positive deflection on the ECG and, along with V4, can show changes in the ST segment or T wave. **Lead V6—**Lead V6, the last of the precordial leads, is placed level with V4 at the midaxillary line. This lead produces a positive deflection on the ECG. **Modified leads** • Lead MCL1 ➢ Similar to V1 ➢ Assesses QRS-complex arrhythmias, P-wave changes, and bundle-branch defects ➢ Monitors premature ventricular contractions ➢ Distinguishes different types of tachycardia • Lead MCL6 ➢ Similar to V6 ➢ Monitors ventricular conduction changes				

<table>
<tr><th>S.No.</th><th>Time</th><th>Specific Objective</th><th>Content</th><th>A.V Aids</th><th>Teaching Activity</th><th>Learning Activity</th><th>Evaluation</th></tr>
<tr><td></td><td></td><td></td><td>
THE LEAD ORIENTATION
The leads with respect to different regions of the left ventricle are,
<table>
<tr><th>ECG LEADS</th><th>REGION OF VENTRICLE</th></tr>
<tr><td>V1, V2</td><td>Septal</td></tr>
<tr><td>V3, V4</td><td>Anterior</td></tr>
<tr><td>V5, V6</td><td>Lateral</td></tr>
<tr><td>V1 TO V4</td><td>Antero - septal</td></tr>
<tr><td>V3 TO V6</td><td>Antero – lateral</td></tr>
<tr><td>L1, aVL</td><td>High lateral</td></tr>
<tr><td>Lii, Liii, aVF</td><td>Inferior</td></tr>
</table>
LEADS SEES
<table>
<tr><th>LEADS</th><th>HEART SURFACE VIEWED</th></tr>
<tr><td>II, III, aVF</td><td>Inferior</td></tr>
<tr><td>V1, V2</td><td>Septal</td></tr>
<tr><td>V3, V4</td><td>Anterior</td></tr>
<tr><td>I, aVL, V5, V6</td><td>Lateral</td></tr>
</table>
</td><td></td><td></td><td></td><td></td></tr>
</table>

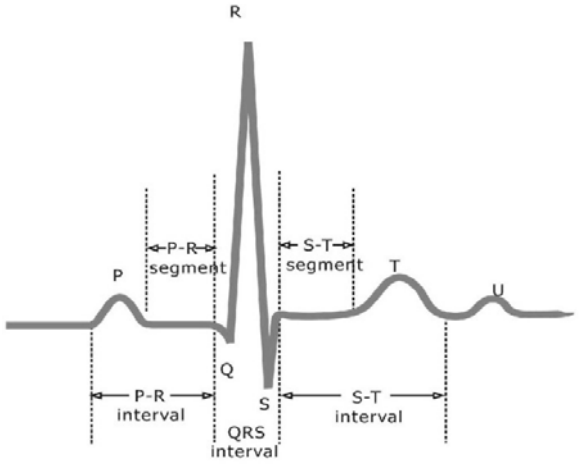
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			ELECTRODE CONFIGURATIONS Three-electrode system uses one positive electrode, one negative electrode, and a ground. Five-electrode system uses an exploratory chest lead to monitor modified chest or standard limb leads. One newer application of bedside cardiac monitoring is a reduced lead continuous 12-lead ECG system (EASI system), which uses an advanced algorithm and only five electrodes uniquely placed on the torso to derive a 12-lead ECG. The system allows all 12 leads to be simultaneously displayed and recorded. **Placement of the electrodes for the EASI system includes:** ➢ E lead: lower part of the sternum at the level of the fifth intercostal space ➢ A lead: left midaxillary line at the level of the fifth intercostal space ➢ S lead: upper part of the sternum				

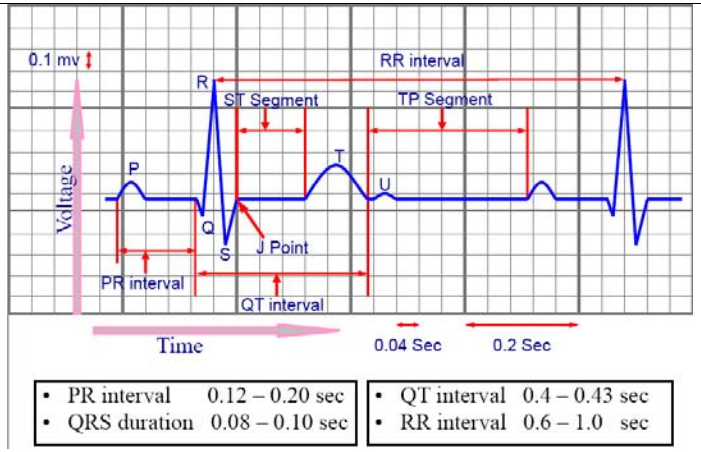
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			➢ I lead: right midaxillary line at the level of the fifth intercostal space ➢ Ground: anywhere on the torso. **EINTHOVEN'S TRIANGLE** When setting up standard limb leads, you'll place electrodes in positions commonly referred to as Einthoven's triangle. The electrodes for leads I, II, and III are about equidistant from the heart and form an equilateral triangle. **Axes** The axis of lead I extends from shoulder to shoulder, with the right-arm electrode being the negative electrode and the left-arm electrode positive. The axis of lead II runs from the negative right-arm electrode to the positive left-leg electrode. The axis of lead III extends from the negative left-arm electrode to the positive left-leg electrode.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			  **ECG GRID** • Wave forms produced by the heart's electrical current are recorded on graphed ECG paper.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• ECG paper consists of horizontal and vertical lines forming a grid. • A piece of ECG paper is called an *ECG strip* or *tracing*.ECG paper is made up of small and large boxes measured in millimeters. The smallest boxes are one millimeter wide and 1- mm high. • The horizontal axis of the ECG strip represents time. • ECG paper normally records at a constant speed of 25 mm/ sec. • Each small block equals 0.04 second, and five small blocks form a large block, which equals 0.2 second. This time increment is determined by multiplying 0.04 second (for one small block) by 5, the number of small blocks that compose a large block. • Five large blocks equal1 second (5 ×0.2). • When measuring or calculating a patient's heartrate, a 6-second strip The horizontal axis of the ECG strip represents time. Each consisting of 30 large blocks is usually used. ➢ The ECG strip's vertical axis measures				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			amplitude in millimeters (mm) or electrical voltage in millivolts (mV). ➢ Each small block represents 1 mm or 0.1 mV; each large block, 5 mm or 0.5 mV. ➢ To determine the amplitude of a wave, segment, or interval, count the number of small blocks from the baseline to the highest or lowest point of the wave, segment, or interval.				
6	2 Min	The group should be able to define Waveform	**WAVEFORM (Deflection)** • A waveform or deflection is movement away from the baseline in a positive (upward) or negative (downward) direction. • Waveforms are named alphabetically, beginning with P, Q,R,S, T and U. the QRS waves together make up a complex, and the interval between the S wave and beginning of the T wave is called the ST segment. • When electrical activity is not detected, a straight line is recorded. This line is called the baseline or	PowerPoint presentation	Lecture cum Discussion	Listening Asking doubts	What is a waveform in ECG?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			isoelectric line. • If the wave of depolarization moves toward the positive electrode, the waveform recorded on ECG graph paper will be upright. If the wave of depolarization moves away from the positive electrode, the waveform recorded will be inverted.  				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
7	45Min	The group should be able to describe the components of ECG	 **THE NORMAL ECG VALUES** **The P wave** • The P wave is the first component of a normal ECG waveform. • It represents atrial depolarization—conduction of an electrical impulse through the atria. • The first half of the P-wave is recorded when the electrical impulse that originated in the SA node stimulates the right atrium and reaches the AV node.	PowerPoint presentation	Lecture cum Discussion, Explaining, Motivating, Clarifying doubts	Listening, Taking notes, Asking doubts	What are the components of ECG?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			The downslope of the P wave represent the stimulation of left atrium, thus P wave represents atrial depolarization and the spread of electrical impulses throughout the right and left atria. **A normal P wave has the following characteristics:** location—precedes the QRS complex amplitude- not more than 2.5 mm ht duration—0.06 to 0.12 second configuration—usually rounded and upright deflection - positive or upright in leads I, II, aVF, and V2 to V6; usually positive but variable in leads III and aVL; negative or inverted in lead aVR; biphasic or variable in lead V1. If the deflection and configuration of a P wave are normal— for example, if the P wave is upright in lead II and is rounded and smooth—and if the P wave precedes each QRS complex, then this electrical impulse originated in the sinoatrial (SA) node. The atria start to contract				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			partway through the P wave, but you won't see this on the ECG. Remember, the ECG records electrical activity only, not mechanical activity or contraction. The P wave is normally upright in most of ECG leads with 2 exceptions. In aVR, it is inverted as the direction of atrial activation is away from this lead.In lead V1, it is generally biphasic (upright with small terminal deflection), representing left atrial activation in reverse direction. **The odd Ps** Peaked, notched, or enlarged P waves may represent atrial hypertrophy or enlargement associated with chronic obstructive pulmonary disease, pulmonary emboli, valvular disease, or heart failure. Inverted P waves may signify retrograde or reverse conduction from the atrioventricular (AV) junction toward the atria.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Varying P waves indicate that the impulse may be coming from different sites, as with a wandering pacemaker rhythm, irritable atrial tissue, or damage near the SA node. If the ectopic pacemaker is in the AV bundle, P wave is inverted in lead II. Absent P waves may signify conduction by a route other than the SA node, as with ajunctional or atrial fibrillation rhythm. **THE QRS COMPLEX** The QRS complex follows the P wave and represents depolarization of the ventricles. Immediately after the ventricles depolarize, as represented by the QRS complex, they contract. That contraction ejects blood from the ventricles and pumps it through the arteries, creating a pulse.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			CHARACTERISTICS A normal complex has the following characteristics: location—follows the PR interval amplitude—5 to 30 mm high but differs for each lead used duration—0.06 to 0.10 second, or half of the PR interval. Duration is measured from the beginning of the Q wave to the end of the S wave or from the beginning of the R wave if the Q wave is absent. Configuration—consists of the Q wave (the first negative deflection after the P wave), the R wave (the first positive deflection after the P wave or the Q wave), and the S wave (the first negative deflection after the R wave). You may not always see all three waves. The ventricles depolarize quickly, minimizing contact time between the stylus and the ECG paper, so the QRS complex typically appears thinner than other ECG components. It may also look different in each lead.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Depolarization spreads through the heart in many directions at once, but the shape of QRS complex shows the average direction in which the wave of depolarization spreading through the ventricles. If the QRS complex is predominantly upward, or positive(R wave > S wave), the depolarization is moving towards that lead. If downward or negative(S wave > R wave), the depolarization is moving away from that lead. When the depolarization wave is moving at right angles to the lead, the R and S waves are of equal size. • deflection—positive in leads I, II, III, aVL, aVF, and V4 to V6 and negative in leads aVR and V1 to V3. QRS complex represents intra ventricular conduction time. That's why identifying and correctly interpreting it is so crucial. If no P wave appears with the QRS complex, then the impulse may have originated in the ventricles, indicating a ventricular arrhythmia.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			THE QRS COMPLEX IN THE V -LEADS The shape of the QRS complex in the chest(V) leads is determined by two things; • The septum between the ventricles is depolarized before the walls of the ventricles, and the depolarization wave spreads across the septum from left to right. • In the normal heart there is more muscles in the walls of the left ventricle than in that of the right ventricle, and so the left ventricle exerts more influence on the ECG pattern than does the right ventricle. Leads V1 and V2 look at the right ventricle, leads V3 and V4 look at the septum, and leads V5 and V6 at the left ventricle. • Lead V1 and V2 look at the right ventricle, leads V3 and V4 look at the septum, and leads V5 and V6 at the left ventricle. • In a right ventricular lead the deflection is first upward (R wave) as the septum is depolarized. In a left ventricular lead there is small downward deflection.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			(septal Q wave). • When the whole of the myocardium is depolarized the ECG trace returns to baseline. • The QRS complex in the hest leads shows a progression from lead V1, where it is predominantly downward, to lead V6, where it is predominantly upward. The 'transition point', where the R and S wave are equal, indicates the position of the inter ventricular septum. **Abnormalities- QRS** ➢ Deep, wide Q waves may represent myocardial infarction. In this case, the Q-wave amplitude is 25% of the R-wave amplitude, or the duration of the Q wave is 0.04 second or more. ➢ A notched R wave may signify a bundle-branch block. ➢ A widened QRS complex (greater than 0.12 second) may signify a ventricular conduction delay. A missing QRS complex may indicate AV block or ventricular standstill.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			THE PR INTERVAL • The PR interval tracks the atrial impulse from the atria through the AV node, bundle of His, and right and left bundle branches. • When evaluating a PR interval, look especially at its duration. • Changes in the PR interval indicate an altered impulse formation or a conduction delay, as seen in AV block. **A normal PR interval has the following characteristics** (amplitude, configuration, and deflection aren't measured): • location—from the beginning of the P wave to the beginning of the QRS complex • duration—0.12 to 0.20 second. **The short and long P-R interval** • Short PR intervals (less than 0.12 second) indicate that the impulse originated somewhere other than the SA				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			node. This variation is associated with junctional arrhythmias and preexcitation syndromes. • Prolonged PR intervals (greater than 0.20 second) may represent a conduction delay through the atria or AV junction due to digoxin toxicity or heart block—slowing related to ischemia or conduction tissue disease. **THE ST SEGMENT** • The ST segment represents the end of ventricular conduction or depolarization and the beginning of ventricular recovery or repolarization. • The point that marks the end of the QRS complex and the beginning of the ST segment is known as the *J point* (ST junction). **Normal ST** A normal ST segment has the following characteristics (amplitude, duration, and configuration aren't observed):				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Normal ST segment begins at the isoelectric line, extends from the end of the S wave, and curves gradually upwards to the beginning of the T wave. • location—extends from the S wave to the beginning of the T wave • deflection—usually isoelectric (neither positive nor negative); may vary from –0.5 to +1 mm in some precordial leads. **ABNORMAL ST** A change in the ST segment may indicate myocardial damage. An ST segment may become either elevated or depressed. **ST-segment depression** An ST segment is considered depressed when it's 0.5 mm or more below the baseline. A depressed ST segment may indicate myocardial ischemia or digoxin toxicity.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			ST-segment elevation An ST segment is considered elevated when it's 1 mm or more above the baseline. An elevated ST segment may indicate myocardial injury. **THE T WAVE** The T wave represents ventricular recovery or repolarization. **Normal T waves** have the following characteristics: • location—follows the S wave • amplitude—0.5 mm in leads I, II, and III and up to 10 mm in the precordial leads • configuration—typically round and smooth • deflection—usually upright in leads I, II, and V3 to V6; inverted in lead aVR; variable in all other leads.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Why is that T so bumpy? The T wave's peak represents the relative refractory period of ventricular repolarization, a period during which cells are especially vulnerable to extra stimuli. Bumps in a T wave may indicate that a P wave is hidden in it. If a P wave is hidden, atrial depolarization has occurred, the impulse having originated at a site above the ventricles. **Tall, inverted, or pointy Ts** • Tall, peaked, or tented T waves indicate myocardial injury or hyperkalemia. • Inverted T waves in leads I, II, or V3 through V6 may represent myocardial ischemia. • Heavily notched or pointed T waves in an adult may mean pericarditis. **THE QT INTERVAL** The QT interval measures ventricular depolarization and repolarization.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			The length of the QT interval varies according to heart rate. The faster the heart rate, the shorter the QT interval. When checking the QT interval, look closely at the duration. **A normal QT interval** has the following: • location—extends from the beginning of the QRS complex to the end of the T wave • duration—varies according to age, sex, and heart rate; usually lasts from 0.36 to 0.44 second; shouldn't be greater than half the distance between consecutive R waves when the rhythm is regular. **The importance of QT** • The QT interval shows the time needed for the ventricular depolarization-repolarization cycle. An abnormality in duration may indicate myocardial problems. Prolonged QT intervals indicate • that the relative refractory period is longer.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• A prolonged QT interval increases the risk of a life-threatening arrhythmia known as torsades de pointes. • This variation is also associated with certain medications such as Class IA antiarrhythmics. • Prolonged QT syndrome is a congenital conductionsystem defect present in certain families. Short QT intervals may result from digoxin toxicity or hypercalcemia. **THE U WAVE** The U wave represents the recovery period of the Purkinje or ventricular conduction fibers. It isn't present on every rhythm strip. The configuration is the most important characteristic of the U wave. **A normal U wave** has the following characteristics: • location—follows the T wave • configuration—typically upright and rounded				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• deflection—upright. The U wave may not appear on an ECG. A prominent U wave may be due to • Central nervous system disease • Hypercalcemia • hypokalemia, • Medications like amiodarone digitalis, procainamide, quinidine, digoxin toxicity • Hyperthyroidism				
8	45Min	The group should able to explain the steps of ECG interpretation	**INERPRETING ECG** **8-STEP METHOD** Interpreting a rhythm strip is a skill developed through practice. Rhythm strip analysis requires a sequential and systematic approach such as that which employs the eight step. **STEP 1: DETERMINE THE RHYTHM** • To determine the heart's atrial and ventricular rhythms, use either the paper-and-pencil method or the	PowerPoint presentation ECG strips, Worksheets	Lecture cum Discussion, Explaining, Motivating, Clarifying doubts	Listening, Taking notes , Asking doubts	What are the steps involved in ECG interpretation?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			caliper method. • For atrial rhythm, measure the P-P intervals—the intervals between consecutive P waves. These intervals should occur regularly with only small variations associated with respirations. Then compare the P-P intervals in several cycles. Consistently similar P-P intervals indicate regular atrial rhythm; dissimilar P-P intervals indicate irregular atrial rhythm. To determine the ventricular rhythm, measure the intervals between two consecutive R waves in the QRS complexes. If an R wave isn't present, use the Q wave of consecutive QRS complexes. The R-R intervals should occur regularly. Then compare R-R intervals in several cycles. As with atrial rhythms, consistently similar intervals mean a regular rhythm; dissimilar intervals point to an irregular rhythm.				
			METHODS OF MEASURING RHYTHM Can use the paper-and-pencil or caliper method to determine atrial or ventricular rhythm.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Paper and-pencil method Place the ECG strip on a flat surface. Then position the straight edge of a piece of paper along the strip's baseline. Move the paper up slightly so the straight edge is near the peak of the R wave. With a pencil, mark the paper at the R waves of two consecutive QRS complexes. This is the R-R interval. Next, move the paper across the strip, aligning the two marks with succeeding R-R intervals. If the distance for each R-R interval is the same, the ventricular rhythm is regular. If the distance varies, the rhythm is irregular. Use the same method to measure the distance between the P waves (the P-P interval) and determine whether the atrial rhythm is regular or irregular. **Caliper method** With the ECG on a flat surface, place one point of the caliper on the peak of the first R wave of two consecutive QRS complexes. Then adjust the caliper legs				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			so the other point is on the peak of the next R wave. This distance is the R-R interval. Now pivot the first point of the caliper toward the third R wave and note whether it falls on the peak of that wave. Check succeeding R-R intervals in the same way. If they're all the same, the ventricular rhythm is regular. If they vary, the rhythm is irregular. Use the same method to measure the P-P intervals to determine whether the atrial rhythm is regular or irregular. **STEP 2: DETERMINE THE RATE** • **10-times method** The easiest way to calculate heart rate is the 10-times method, especially if the rhythm is irregular. To figure the atrial rate, obtain a 6-second strip, count the number of P waves, and multiply by 10. Ten 6-second strips represent 1 minute. Calculate ventricular rate the same way, using the R waves. Or Count the number of QRS complexes in one six-				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			second interval. Then multiply this number by 10 will give the no of QRS complexes in sixty seconds, which is the approximate heart rate. • **1,500 method** If the heart rhythm is regular, use the 1,500 method — so named because 1,500 small squares represent 1 minute.(ECG paper moves by 25 small squares in one second.ie, 25 x 60 = 1500 small squares in 60 seconds or one minute.) Count the small squares between identical points on two consecutive P waves and then divide 1,500 by that number to get the atrial rate. To obtain the ventricular rate, use the same method with two consecutive R waves. • **Sequence method** The third method of estimating heart rate is the sequence method, which requires that you memorize a sequence of numbers. To get the atrial rate, find a P wave that peaks on a heavy black line and assign the following				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			numbers to the next six heavy black lines: 300, 150, 100, 75, 60, and 50. Then find the next P wave peak and estimate the atrial rate, based on the number assigned to the nearest heavy black line. Estimate the ventricular rate the same way, using the R wave. **STEP 3: EVALUATE THE P WAVE** • Are P waves present? • Do they all have normal configurations? • Do they all have a similar size and shape? • Is there one P wave for every QRS complex? **STEP 4: DETERMINE THE DURATION OF THE PR INTERVAL** To measure the PR interval, count the small squares between the start of the P wave and the start of the QRS complex; then multiply the number of squares by 0.04second. Check whether the duration is normal 0.12 to 0.20 second.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			STEP 5: DETERMINE THE DURATION OF THE QRS COMPLEX When determining QRS duration, be sure to measure straight across from the end of the PR interval to the end of the S wave, not just to the peak. Remember, the QRS has no horizontal components. To calculate duration, count the number of small squares between the beginning and end of the QRS complex and multiply this number by 0.04 second. Then check: • Is the duration a normal 0.06 to 0.10 second? • Are all QRS complexes the same size and shape? • Does a QRS complex appear after every P wave? **STEP 6: EVALUATE THE T WAVES** Examine the strip for T waves. Then check: • Are T waves present?				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• Do they all have a normal shape? • Do they all have a normal amplitude? • Do they all have the same amplitude? • Do the T waves have the same deflection as the QRS complexes? **STEP 7: DETERMINE THE DURATION OF THE QT INTERVAL** Count the number of small squares between the beginning of the QRS complex and the end of the T wave, where the T wave returns to the baseline. Multiply this number by 0.04 second. Check is the duration a normal 0.36 to 0.44 second? **Correcting the QT interval** • The QT interval is affected by the patient's heart rate. As the heart rate increases, the QT interval decreases; as the heart rate decreases, the QT interval increases. For this reason, evaluating the QT interval based on a standard heart rate of 60 is recommended. This corrected QT				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			interval is known as ***QTc*.** • The following formula is used to determine the QTc: QT interval √ R-R interval in seconds • The normal QTc for women is less than 0.46 second and for men is less than 0.45 second. • When the QTc is longer than 0.50 second in men or women, torsades de pointes is more likely to develop. **STEP 8: EVALUATE ANY OTHER COMPONENTS** Check for **ectopic beats** and other abnormalities. Also check **the ST segment** for abnormalities, and look for the **presence of a U wave**. Interpret them by naming the rhythm strip according to one or all of these findings: • origin of the rhythm (for example, sinus node, atria, AV node, or ventricles) • rate characteristics (for example, bradycardia or				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			tachycardia)rhythm abnormalities (for example, flutter, fibrillation, heart block, escape rhythm, or other arrhythmias).				
9	10 min	The group should be able to describe the characteristics of Normal Sinus Rhythm	**NORMAL SINUS RHYTHM** **Characteristics of normal sinus rhythm**: • Regular rhythm • Normal rate • A P wave for every QRS complex; all P waves similar in size and shape • All QRS complexes similar in size and shape • Normal PR and QT intervals • Normal (upright and round) T waves. • P waves are rounded, smooth, and upright in lead II, signaling that a sinus impulse has reached the atria. • The PR interval is normal (0.12 to 0.20 second), indicating that the impulse is following normal conduction pathways. • The QRS complex is of normal duration (less than 0.12 second), representing normal ventricular	PowerPoint presentation	Lecture cum Discussion, Explaining, Clarifying doubts	Listening	What are the characteristics of normal sinus rhythm?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
10	10 min	The group should be able to enumerate the normal measurements of ECG components	impulse conduction and recovery. • The T wave is upright in lead II, confirming that normal repolarization has taken place. • The QT interval is within normal limits (0.36 to 0.44 second). • No ectopic or aberrant beats occur. **RHYTHM STRIP INTERPRETATION REVIEW** **Normal P wave** • Location—before the QRS complex • Amplitude—2 to 3 mm high • Duration—0.06 to 0.12 second • Configuration—usually rounded and upright • Deflection—positive or upright in leads I, II, aVF, and V2 to V6; usually positive but may vary in leads III and aVL; negative or inverted in lead aVR; biphasic or variable in lead V1 **Normal PR interval** • Location—from the beginning of the P wave to the	PowerPoint presentation	Lecture cum Discussion, Explaining, Clarifying doubts	Listening, Taking notes, Asking doubt	What are the characteristics of p wave?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			beginning of the QRS complex • Duration—0.12 to 0.20 second **Normal QRS complex** • Location—follows the PR interval • Amplitude—5 to 30 mm high but differs for each lead used • Duration—0.06 to 0.10 second, or half the PR interval • Configuration—consists of the Q wave, the R wave, and the S wave • Deflection—positive in leads I, II, III, aVL, aVF, and V4 to V6 and negative in leads aVR and V1 to V3 **Normal ST segment** • Location—from the S wave to the beginning of the T wave • Deflection—usually isoelectric; may vary from –0.5 to + 1 mm in some precordial leads				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Normal T wave • Location—after the S wave • Amplitude—0.5 mm in leads I, II, and III and up to 10 mm in the precordial leads • Configuration—typically round and smooth • Deflection—usually upright in leads I, II, and V3 to V6; inverted in lead aVR; variable in all other leads **Normal QT interval** • Location—from the beginning of the QRS complex to the end of the T wave • Duration—varies; usually lasts from 0.36 to 0.44 second. **Normal U wave** • Location—after T wave • Configuration—typically upright and rounded • Deflection—upright.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
11	20 min	The group should be able to explain nurse's responsibility in obtaining 12-Lead ECG	**OBTAINING A 12-LEAD ECG- NURSE'S RESPONSIBILITY** To obtain the ECG, • gather the appropriate supplies • explain the procedure to the patient • attach the electrodes properly • know how to use an ECG machine • interpret the recordings. **Preparing for the recording** First, gather all the necessary supplies, including the ECG machine, recording paper, electrodes, and gauze pads. Take them to the patient's bedside. Then perform these actions. **Explain the procedure** Tell the patient that the practitioner has ordered an ECG, and explain the procedure. Emphasize that the test takes only a few minutes and that it's a safe and painless way to evaluate cardiac	Powerpoint presentation	Lecture cum Discussion, Explaining, Clarifying doubts	Listening, Taking notes, Asking doubt	What are the nurses responsibilities in obtaining 12-Lead ECG?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			function. Answer the patient's questions, and offer reassurance . Preparing him well helps alleviate anxiety and promote cooperation. **Explain the procedure** Ask the patient to lie in a supine position in the center of the bed with his arms at his sides. If he can't tolerate lying flat, raise the head of the bed to semi-Fowler's position. Ensure privacy, and expose the patient's arms, legs, and chest, draping him for comfort. **Select the electrode sites** Select the areas where you'll attach the electrodes. Choose spots that are flat and fleshy, not muscular or bony. Clip the area if it's excessively hairy. Clean excess oil or other substances from the skin to enhance electrode contact. The better the electrode contact, the better the recording.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Make the recording The 12-lead ECG offers 12 different views of the heart. To help ensure an accurate recording—the electrodes must be applied correctly. Inaccurate placement of an electrode by greater than 5/8_ (1.5 cm) from its standardized position may lead to inaccurate waveforms and an incorrect ECG interpretation. The 12-lead ECG requires four electrodes on the limbs and six across the front of the chest wall. **Limb lead** To record the bipolar limb leads I, II, and III and the unipolar limb leads aVR, aVL, and aVF, place electrodes on both of the patient's arms and on his left leg. The right leg also receives an electrode, but that electrode acts as a ground and doesn't contribute to the waveform. Each electrode is colour coded.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Leads placement To record the six precordial leads (V1 through V6), position the electrodes on specific areas of the anterior chest wall. If they're placed too low, the ECG tracing will be inaccurate. • Place lead V1 over the fourth intercostal space at the right sterna border. To find the space, locate the sternal notch at the second rib and feel your way down along the sternal border until you reach the fourth intercostal space. • Place lead V2 just opposite V1, over the fourth intercostal space at the left sternal border. • Place lead V3 midway between V2 and V4. • Place lead V4 over the fifth intercostal space at the left midclavicular line. • Place lead V5 over the fifth intercostal space at the left anterior axillary line. • Place lead V6 over the fifth intercostal space at the left midaxillary line.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Leads on the back Because of lung and muscle barriers, the usual chest leads can't "see" the heart's posterior surface to record myocardial damage there. Three posterior leads to the 12-lead ECG: leads V7, V8, and V9. These leads are placed opposite anterior leads V4, V5, and V6, on the left side of the patient's back, following the same horizontal line. On rare occasions, a practitioner may request right-sided posterior leads. These leads are labeled V7R, V8R, and V9R and are placed on the right side of the patient's back. Their placement is a mirror image of the electrodes on the left side of the back. This type of ECG provides information on the right posterior area of the heart. **Checking out the right chest** The usual 12-lead ECG evaluates only the left				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			ventricle. If the right ventricle needs to be assessed for damage or dysfunction, the practitioner may order a right chest lead ECG. For example, a patient with an inferior wall MI might have a right chest–lead ECG to rule Out right ventricular involvement. With this type of ECG, the six leads are placed on the right side of the chest in a mirror image of the standard precordial lead placement. Electrodes start at the left sternal border and swing down under the right breast area. **ECG machine** Machines come in two types: • Multichannel recorders • Single-channel recorders. single-channel recorders are rarely used **MULTICHANNEL RECORDER** Attach all electrodes to the patient at once and the machine prints a simultaneous view of all leads.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Steps: • Plug the cord of the ECG machine into a grounded outlet. If the machine operates on a charged battery, it may not need to be plugged in. • Enter the patient's identification data as prompted by the ECG machine. • Prepare the patient's skin, and then place the electrodes on the patient's chest, arms, and legs. • Make sure all leads are securely attached. • Instruct the patient to relax, lie still, and breathe normally. Ask him not to talk during the recording to prevent distortion of the ECG tracing. • Verify that the ECG paper speed selector is set to 25 mm/second. If necessary, calibrate or standardize the machine according to the manufacturer's instructions. • Press the appropriate button to record the ECG. If you're performing a right chest–lead ECG, select the appropriate button for recording or note it on the ECG hardcopy.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• Observe the quality of the tracing. When the machine finishes the recording, turn it off. Remove the electrodes and, if necessary, clean the patient's skin. If the ECG machine you're using also transmits a copy to a central monitoring area, make sure the copy has been transmitted.				
12	2Min		**CONDUCTION ABNORMALITIES- ARRHYTHMIAS** Arrhythmias (also called dysrhythmias) are abnormal heartbeats usually caused by an electrical "short circuit" in the heart. The heart normally beats in a consistent pattern, but an arrhythmia can cause it to beat too slowly, too quickly, or irregularly. This can cause the heart to pump inconsistently, which can lead to symptoms like fatigue, dizziness, and chest pain.				
13	3Min	The group should be able to define Arrhythmias	**DEFINITION OF DYSRHYTHMIAS** Dysrhythmias are disorders of the formation or conduction (or both) of the electrical impulse within the heart. [Brunner and Suddarth (2010).] Cardiac dysrhythmia (also known as arrhythmia) is a term for any of a large and heterogeneous group of	PowerPoint presentation	Lecture cum Discussion	Listening, Asking doubts	What is arrhythmia?

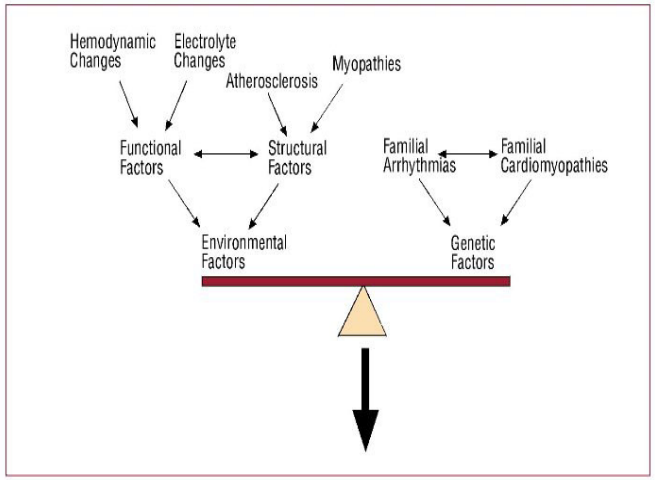
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			conditions in which there is abnormal electrical activity in the heart. The heart beat may be too fast or too slow, and may be regular or irregular. [Wikipedia] These disorders can cause disturbances of the heart rate, the heart rhythm, or both. Dysrhythmias may initially be evidenced by the hemodynamic effect they cause (e.g., a change in conduction may change the pumping action of the heart and cause decreased blood pressure). Dysrhythmias are diagnosed by analyzing the electrocardiographic waveform. They are named according to the site of origin of the impulse and the mechanism of formation or conduction involved. For example, an impulse that originates in the sinoatrial (SA) node and that has a slow rate is called sinus bradycardia.				
14	10 min	The group should be able to enlist types of	**TYPES OF DYSRHYTHMIAS** **Mechanisms of Formation or Conduction** Normal (idio) rhythm	PowerPoint presentation	Lecture cum Discussion, explaining,	Listening, Taking notes , Asking doubts	What are the different types of

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
		arrhythmias	• Bradycardia • Tachycardia • Dysrhythmia • Flutter • Fibrillation • Premature complexes • Blocks **II.Sites of Origin** • Sinus (SA) node • Atria • Atrioventricular (AV) node or junction • Ventricles. **1)Atrial** • Premature Atrial Contractions (PACs) • Wandering Atrial Pacemaker • Multifocal atrial tachycardia • Atrial flutter		Motivating		arrhythmias?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• Atrial fibrillation **2) Junctional arrhythmias** • Supraventricular tachycardia (SVT) • AV nodal reentrant tachycardia is the most common cause of Paroxysmal Supra-ventricular Tachycardia (PSVT) • Junctional rhythm • Junctional tachycardia • Premature junctional complex **III) Ventricular** • Premature Ventricular Contractions (PVC) sometimes called Ventricular Extra Beats (VEBs) Premature Ventricular beats occurring after every normal beat are termed ventricular bigeminy PVCs that occur at intervals of 2 normal beats to 1 PVC are termed PVCs in trigeminy Three premature ventricular grouped together is termed "A Run of PVCs", runs lasting longer than 3 beats				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			are generally referred to as ventricular tachycardia Accelerated idioventricular rhythm Monomorphic Ventricular tachycardia Polymorphic ventricular tachycardia Ventricular fibrillation				
15	5Min	The group should be able to enumerate the etiological factors of arrhythmia	**ETIOLOGY** Arrhythmia may be caused by many different factors, including: • Coronary artery disease • Electrolyte imbalances • Changes in heart muscle • Injury from a heart attack • Healing process after heart surgery • Sinoatrial node problems • Atherosclerosis • High blood pressure • Diabetes • Stress • Caffeine	PowerPoint presentation	Lecture cum Discussion, Explaining	Listening, Taking notes, Asking doubts	What are the etiological factors of arrhythmia?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• Cold medicines • Smoking • Irregular heart rhythms can also occur is normal hearts **NON-CONTROLLABLE RISK FACTORS** • Family history of heart disease • Advancing age • Gender • Heart surgery **CONTROLLABLE RISK FACTORS** • Stress • Tobacco • Drug or alcohol abuse • Excess weight • Cough and cold medicines • In short Arrythmia				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
16	10 min	The group should able to explain the pathophysiology of arrhythmia	 **PATHOPHYSIOLOGY** Regardless of the specific arrhythmia, the pathogenesis of the arrhythmias falls into one of three basic mechanisms: **Enhanced or suppressed automaticity,** **Disturbance in conduction system** **Re-entry** • **Automaticity** is a natural property of all myocytes. Ischemia, scarring, electrolyte disturbances, medications, advancing age, and other factors may	PowerPoint presentation	Lecture cum Discussion, Explaining, Motivating, Clarifying doubts	Listening, Taking notes, Asking doubts	What is the patho physiology of arrhythmi?a

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			suppress or enhance automaticity in various areas. Suppression of automaticity of the sinoatrial (SA) node can result in sinus node dysfunction and in sick sinus syndrome (SSS), which is still the most common indication for permanent pacemaker implantation. In contrast to suppressed automaticity, enhanced automaticity can result in multiple arrhythmias, both atrial and ventricular. Triggered activity occurs when early after depolarization and delayed after depolarizations initiate spontaneous multiple depolarizations, precipitating ventricular arrhythmias. Examples include torsades de pointes and ventricular arrhythmias caused by digitalis toxicity. • **Disturbance in conduction pathway** usually following scarring and fibrosis of conduction pathway associated with myocardial infarction, rheumatic heart disease, surgery involving inter ventricular				

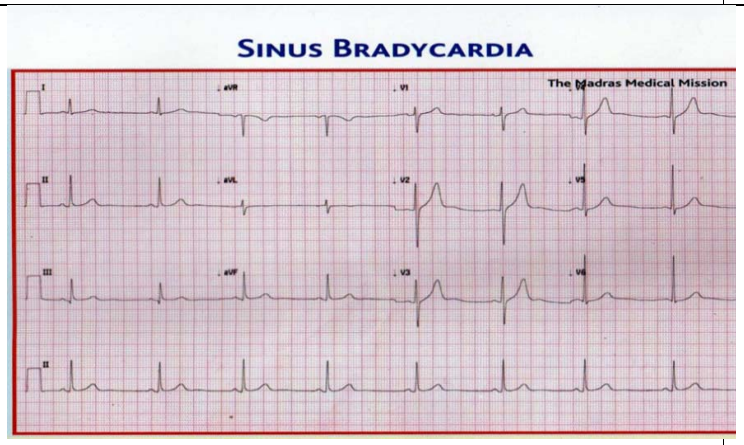
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			septum etc • **Re-entry.** Requisites for re-entry include bidirectional conduction and unidirectional block. Micro level re-entry occurs with VT from conduction around the scar of myocardial infarction (MI), and macro level re-entry occurs via conduction through (Wolff-Parkinson-White [WPW] syndrome) concealed accessory pathways. The significance of all dysrhythmia is their effect on cardiac output and therefore cerebral and vascular perfusion. During normal sinus rhythm, the atria contract to fill and stretch the ventricles with about 30% more blood. This process, called the atrial kick, increases the amount of blood in the ventricles before contractility, thereby increasing cardiac output by 30 %. When the impulse originates below the SA node, or more than one area fires in the atria to originate a beat, the atrial kick is lost and cardiac output falls that 30%.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
17	5Min	The group should be able to list out the clinical features of arrhythmia	**CLINICAL FEATURES** An arrhythmia can be silent and not cause any symptoms. A health person can detect an irregular heart beat during a physical examination by checking pulse or through an ECG. When symptoms of an arrhythmia occur, they may include: • Palpitations (a feeling of skipped heart beats, fluttering or flip- flops, or feeling that heart is "running away") • Pounding in the chest • Dizziness or feeling light headed • Fainting • Shortness of breath • Chest discomfort • Weakness or fatigue • Syncope • Pallor • Diaphoresis • Altered mentation (restlessness and agitation to lethargy and coma)	PowerPoint presentation	Lecture cum Discussion, Explaining, Clarifying doubts, Motivating	Listening, Taking notes, Asking doubts	What are the clinical features of arrhythmia?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• Orthopnea • Paroxysmal nocturnal dyspnea • Hypotension • Sluggish capillary refill • Swelling of the extremities • Decreased urine output				
18	5Min	The group should be able to describe the diagnostic studies of arrhythmia	**DIAGNOSTIC STUDIES** Tests used to diagnose an arrhythmia or determine its cause include: • Electro cardiogram • Holter monitoring • Event monitor A cardiac event monitor is a device used to monitor patients with transient cardiac symptoms. There are two broad classifications of cardiac event monitors. Automatic ECG event monitors has the ability to monitor the patients ECG and make recordings of abnormal events without requiring patient intervention.	PowerPoint presentation	Lecture cum Discussion, Explaining	Listening, Taking notes	What are the diagnostic studies of arrhythmia

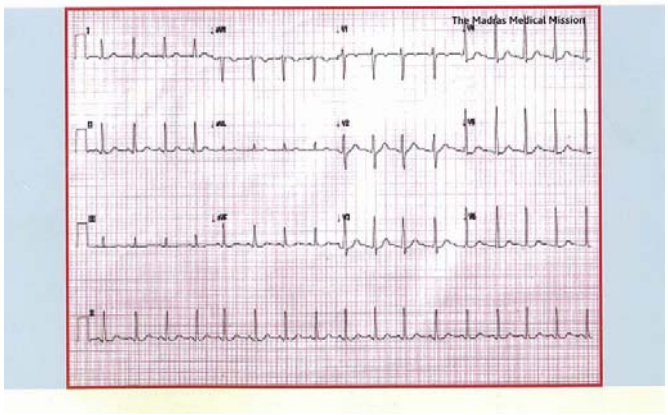
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Manual ECG event recorders require patient to be symptomatic and to activate the device to cause a recording to be made. • Stress test • Echocardiogram • Cardiac catheterization • Electrophysiology study (EPS) **Head- up tilt table test** A tilt table test, occasionally called up right tilt testing is a medical procedure often used to diagnose dysautonomia or syncope. Patients with symptoms of dizziness with or without a loss of consciousness, suspected to be associated with a drop in blood pressure or positional tachycardia are good candidates for this test. The procedure tests for causes of syncope by attempting to cause syncope by having the patient lie flat on a special table or bed while connected to ECG and				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			blood pressure monitors. The Table then creates a change in posture from lying to standing.				
19	20Min	The group should be able to describe sinus node arrhythmias	**<u>I) SINUS NODE DYSRHYTHMIAS</u>** **1. SINUS BRADYCARDIA:** Sinus bradycardia occurs when the sinus node creates an impulse at a slower-than-normal rate. **Causes** Lower metabolic needs (e.g., sleep, athletic training, hypothermia, hypothyroidism), Vagal stimulation (e.g., from vomiting, suctioning, severe pain, extreme emotions), Medications (e.g., calcium channel blockers, amiodarone, beta-blockers), Increased intracranial pressure, and myocardial infarction (MI), especially of the inferior wall.	PowerPoint presentation ECG booklet	Lecture cum Discussion, Explaining Clarifying doubts, Motivating	Listening, asking doubts, Taking notes	What are sinus node dysrhythmias?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			 **Characteristics** • Ventricular and atrial rate: Less than 60 in the adult • Ventricular and atrial rhythm: Regular • QRS shape and duration: Usually normal, but may be regularly abnormal • P wave: Normal and consistent shape; always in front of the QRS • PR interval: Consistent interval between 0.12 and 0.20 seconds • P: QRS ratio: 1:1				

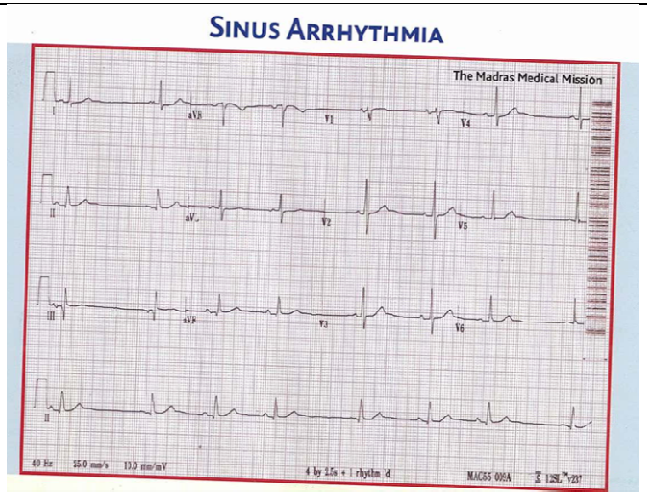
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			All characteristics of sinus bradycardia are the same as those of normal sinus rhythm, except for the rate. **Nursing Priorities:** • Check your patient's blood pressure, assess for syncope, and SOB. • You patient may need to lie down to prevent potential falls. • Keep in mind that it may be normal for some individuals to have sinus bradycardia (e.g. athletes). The patient is assessed to determine the hemodynamic effect and the possible cause of the dysrhythmia. If the decrease in heart rate results from stimulation of the vagus nerve, such as with bearing down during defecation or vomiting, attempts are made to prevent further vagal stimulation. If the bradycardia is from a medication such as a beta-blocker, the medication may be withheld.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			If the slow heart rate causes significant hemodynamic changes, resulting in shortness of breath, decreased level of consciousness, angina, hypotension, ST-segment changes, or premature ventricular complexes, treatment is directed toward increasing the heart rate. **Potential Treatments:** • Asymptomatic: Observation. • Symptomatic: Oxygen, atropine, transcutaneous pacing, dopamine (if hypotensive). Atropine, 0.5 to 1.0 mg given rapidly as an intravenous (IV) bolus, is the medication of choice in treating sinus bradycardia. It blocks vagal stimulation, thus allowing a normal rate to occur. Rarely, catecholamines and emergency transcutaneous pacing also may be implemented. **2.SINUS TACHYCARDIA:** Sinus tachycardia (also called Sinus Tach) is				

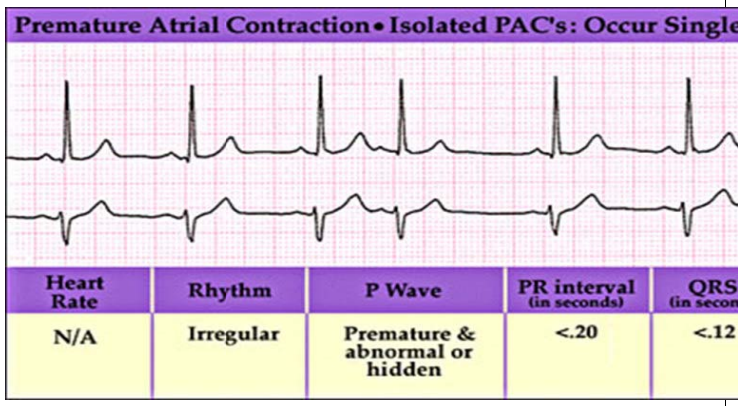
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			characterized by a rapid (> 100 bpm) rate of discharge of the SAnode. The sinus node is discharging at a rate > 100 and the remainder of the conduction follows the normalpathway. As the heart rate increases, the diastolic filling time decreases, possibly resulting in reduced cardiac output and subsequent symptoms of syncope and low blood pressure. If the rapid rate persists and the heart cannot compensate for the decreased ventricular filling, the patient maydevelop acute pulmonary edema. 				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Possible Causes: • Normal cardiac response to demands for increased oxygen need during pain, fever, stress, dehydrationand exercise • Caffeine, nicotine ingestion, • Hyperthyroidism • Post MI or early sign of heart failure **ECG Criteria:** 1. Heart Rate: ≥ 100 bpm to 160 bpm 2. Rhythm: Regular 3. P waves: Upright and normal. One P precedes every QRS 4. PR Interval: .12 - .20 seconds 5. QRS Width: ≤ .12 seconds **Nursing Priorities:** • Check your patient's blood pressure, assess for syncope, palpitations, or SOB. • Your patient may need to lie down to prevent potential				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			falls. • Patient may have lower B/P due to decreased diastolic ventricular filling time associated with thetachycardia. **Potential Treatments:** **Asymptomatic**: Observation. **Symptomatic**: Treat the underlying cause (dehydration, anxiety, etc). Drugs such as beta blockers maybe given to slow the HR. Treatment of sinus tachycardia is usually directed at abolishing its cause. Calcium channel blockers and beta-blockers may be used to reduce the heart rate quickly **3. SINUS ARRHYTHMIA:** Sinus arrhythmia occurs when the sinus node creates an impulse at an irregular rhythm; The rate usually increases with inspiration and decreases with expiration. Nonrespiratory causes include heart disease and valvular disease, but these are rarely seen.				

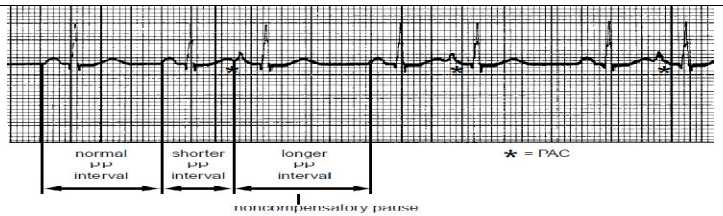
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			 **The ECG criteria:** 1. Ventricular and atrial rate: 60 to 100 in the adult 2. Ventricular and atrial rhythm: Irregular QRS shape and duration: Usually normal, but may be regularly abnormal 3. P wave: Normal and consistent shape; always in front of the QRS 4. PR interval: Consistent interval between 0.12 and 0.20 seconds				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			5. P: QRS ratio: 1:1 Sinus arrhythmia does not cause any significant hemodynamic effect and usually is not treated.				
20	40 min	The group should able to describe Atrial arrhythmias	**II)<u>ATRIAL DYSRHYTHMIAS</u>** **1.PREMATURE ATRIAL COMPLEX:** **Description** A premature atrial contraction results from an ectopic stimulus that arises from somewhere in either the left orthe right atrium, but not in the sinus node. The atria are depolarized from the ectopic stimulus, but theremainder of the conduction is typically normal through the AV Node-Junction and downward into the bundlebranches (i.e. normal PR and QRS morphology and intervals). **Possible Causes:** PACs are very common and may occur in persons with a normal heart or in persons with virtually any type oforganic heart disease.	PowerPoint presentation ECG booklet	Lecture cum Discussion Explaining Clarifying doubts, Motivating	Listening, Asking doubts, Taking notes	What are atrial arrhythmias

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Seenwith caffeine intakeand with emotional stress.: • Administration of sympathomimetic agents (epinephrine, theophylline) • Electrolyte abnormalities • Myocardial ischemia or injury • Digoxin toxicity • Hyperthyroidism  **Identifying features on the ECG** Ventricular and atrial rate: Depends on the underlying rhythm (eg, sinus tachycardia)				

Heart Rate	Rhythm	P Wave	PR interval (in seconds)	QRS (in secon
N/A	Irregular	Premature & abnormal or hidden	<.20	<.12

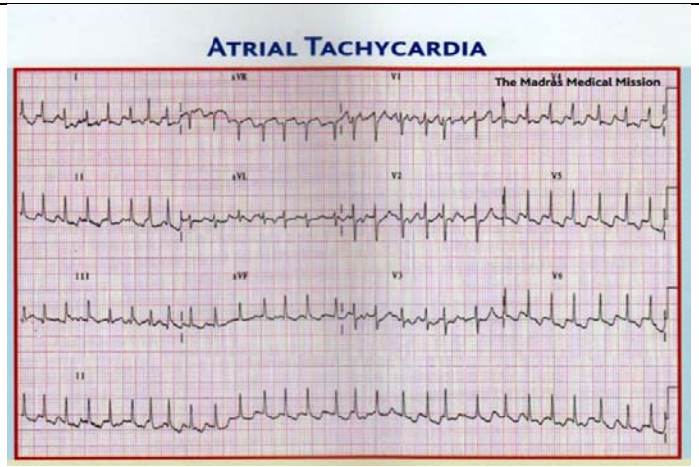
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Ventricular and atrial rhythm: Irregular due to early P waves, creating a PP interval that is shorter than the others. This is sometimes followed by a longer-than-normal PP interval, but one that is less than twice the normal PP interval. This type of interval is called a noncompensatory pause. **QRS shape and duration:** The QRS that follows the early P wave is usually normal, but it may be abnormal (aberrantly conducted PAC). It may even be absent (blocked PAC). **P wave:** An early and different P wave may be seen or may be hidden in the T wave; other P waves in the strip are consistent. **PR interval:** The early P wave has a shorter-than-normal PR interval, but still between 0.12 and 0.20 seconds. P: QRS ratio: usually 1:1				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			 **Other Types of PACs** **Nonconducted PACs**: If the PAC occurs very prematurely (or close to the preceding T wave), the earlyatrial depolarization might be too early for the right and left bundles to conduct the impulse. This typeof PAC cannot be conducted down into the ventricles. In this situation, look for an early P wave (whichmight also be buried in the preceding T wave). The early PAC does not conduct into the ventricles, thusthere is no QRS for this one cardiac cycle.  Nonconducted PAC's (arrows) causing bradycardia				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Aberrantly conducted PACs: If the impulse should happen to travel abnormally through theventricles, the QRS may be prolonged. This can happen if either the right or left bundle branches arenot ready to depolarize and result in a temporary block. If the QRS is wide following a PAC, it will becalled an aberrantly conducted PAC. **Nursing Priorities:** • Intervention not typically required • Heart rate may be irregular during episodes of PACs so assess the pulse for one full minute **Potential Treatments:** PACs are common in normal hearts. The patient may say, "My heart skipped a beat." A pulse deficit (a difference between the apical and radial pulse rate) may exist. If PACs are infrequent, no treatment is necessary. If they are frequent (more than 6 per minute), this may				

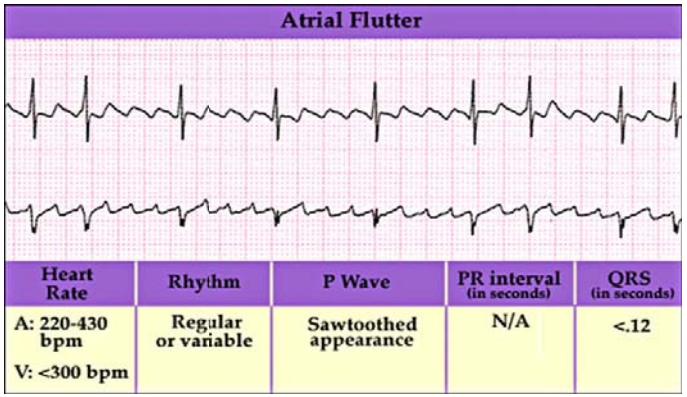
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			herald a worsening disease state or the onset of more serious dysrhythmias, such as atrial fibrillation. Treatment is directed toward the cause. **Asymptomatic:** • Observation and ECG monitoring for frequency and trends. • Explore potential underlying causes (caffeine intake, stress reduction, myocardial abnormalities,etc). **Symptomatic:** • Treatment is typically centered around observation and monitoring for increased frequency. • Be aware that individuals may complain of palpitations or feeling a "skipped" heart beat with anirregular pulse. Explain to them the reason for these feelings. • Increased number of PACs may be a forerunner of the development of atrial fibrillation or otheratrial dysrhythmias				

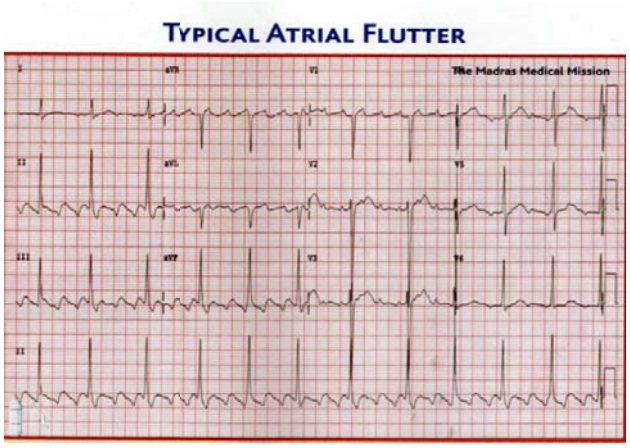
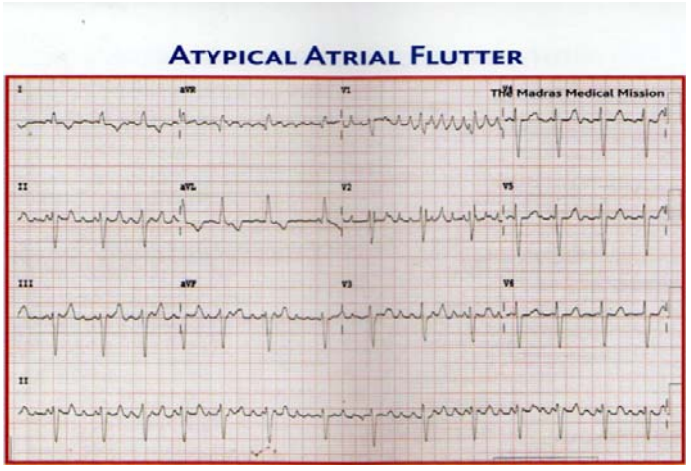
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			2. ATRIAL TACHYCARDIA: Atrial tachycardia is caused by an ectopic focus in the atria. It is often preceded by premature atrial contractions and is characterized by a sudden onset and an abrupt end. The atrial rate is normally between 150 and 250/min. Although the AV junction may conduct all the impulses, there is often a degree of AV block, **Causes** • Digoxin toxicity. • include cardiomyopathy, • sick sinus syndrome, • Ischemic heart disease and rheumatic heart disease. • Multifocal atrial tachycardia can occur in critically ill elderly patients with respiratory disease. It is characterized by multiple atrial foci resulting in P waves of varying morphology and of a variable.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			 **Identifying features on the ECG** • QRS rate: usually 150–200/min. • QRS rhythm: regular. • QRS complexes: normal width and morphology. • P waves: rate between 150 and 250/min, may not be visible, and may be merged into preceding T waves; if visible, different morphology from sinus P waves. • Relationship between P waves and QRS complexes: difficult to ascertain relationship; PR interval often cannot be determined because P waves are not				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• Clearly distinguishable; if there is AV block, P waves may not be conducted to the ventricles (usually 2:1 AV block, i.e. every other P wave is blocked). **Treatment** • Vagal maneuvers and adenosine may be effective at terminating the arrhythmia. • If the patient is taking digoxin, toxicity should be suspected and the digoxin should be omitted (Bennett 1994). • Cardio version should be avoided in these patients because it may produce intractable arrhythmias. • Any electrolyte imbalances should be corrected. • The treatment of multifocal atrial tachycardia associated with respiratory disease is to ensure that serum potassium levels are adequate and to treat the underlying respiratory problem. **3. ATRIAL FLUTTER:** • Atrial flutter occurs in the atrium and creates impulses				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			at an atrial rate between 250 and 400 times per minute. • Because the atrial rate is faster than the AV node can conduct, not all atrial impulses are conducted into the ventricle, causing a therapeutic block at the AV node. This is an important feature of this dysrhythmia. • If all atrial impulses were conducted to the ventricle, the ventricular rate would also be 250 to 400, which would result in ventricular fibrillation, a life-threatening dysrhythmia. **Causes** • Similar to that of atrial fibrillation. **Identifying features on the ECG** • Ventricular and atrial rate: Atrial rate ranges between 250 and 400; ventricular rate usually ranges between 75 and 150. • Ventricular and atrial rhythm: The atrial rhythm is regular; the ventricular rhythm is usually regular but				

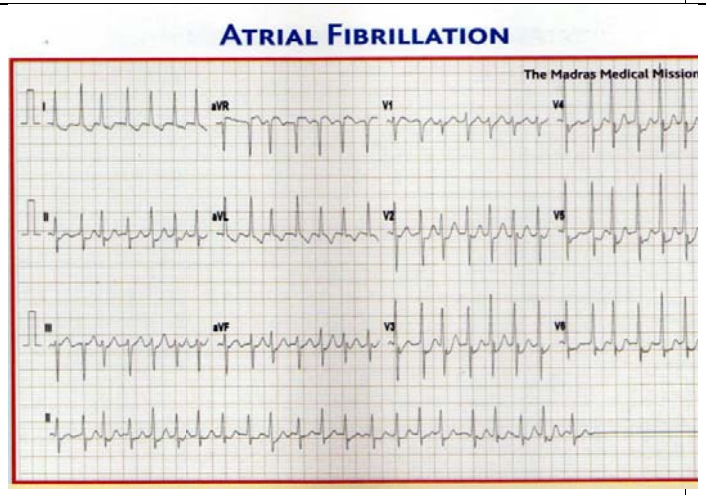
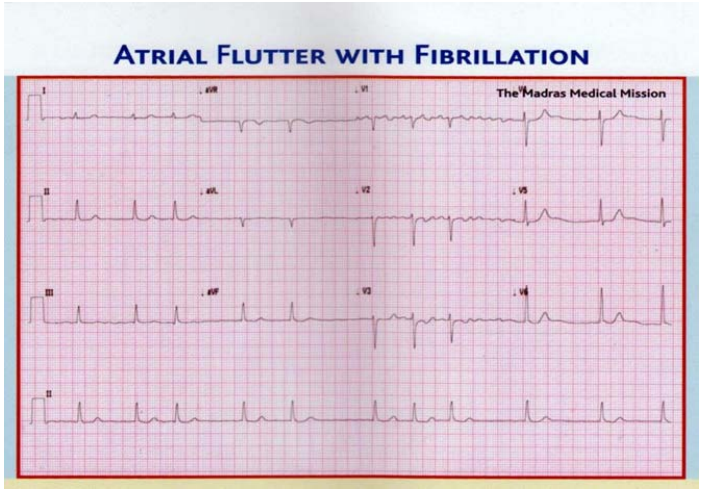
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			may be irregular because of a change in the AV conduction. • QRS shape and duration: Usually normal, but may be abnormal or may be absent • P wave: Saw-toothed shape. These waves are referred to as F waves. • PR interval: Multiple F waves may make it difficult to determine the PR interval. P: QRS ratio: 2:1, 3:1, or 4:1  **Atrial Flutter** Heart Rate: A: 220-430 bpm; V: <300 bpm Rhythm: Regular or variable P Wave: Sawtoothed appearance PR interval (in seconds): N/A QRS (in seconds): <.12				

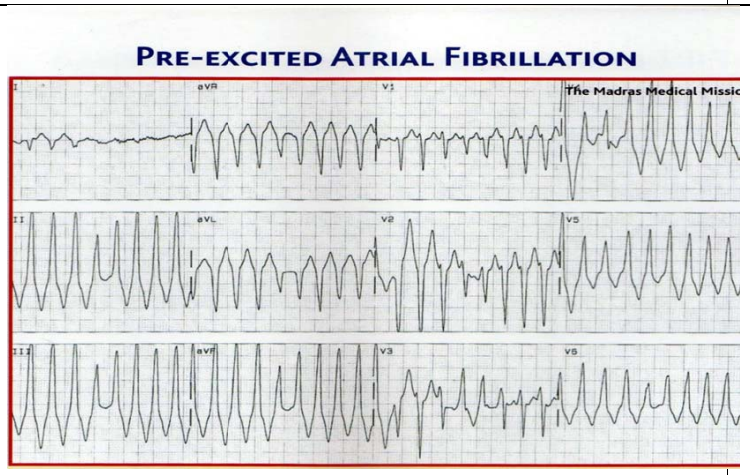
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Types   				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Signs and symptoms, Chest pain, shortness of breath, and low blood pressure. **Treatment** **If the patient is unstable,** Electrical cardio version is usually indicated. **If the patient is stable,** • diltiazem (eg, Cardizem), verapamil (e.g., Calan, Isoptin), beta-blockers, or digitalis may be administered intravenously to slow the ventricular rate. These medications can slow conduction through the AV node. • Flecainide (Tambocor), ibutilide (Corvert), dofetilide (Tikosyn), quinidine (eg, Cardioquin, Quinaglute), disopyramide (Norpace), or amiodarone (Cordarone, Pacerone) may be given to promote conversion to sinus rhythm • If medication therapyis unsuccessful, electrical				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			cardioversion is often successful. • Once conversion has occurred, quinidine, disopyramide, flecainide, propafenone (Rhythmol), amiodarone, or sotalol (Betapace) may be given to maintain sinus rhythm. **4. ATRIAL FIBRILLATION:** Atrial fibrillation causes a rapid, disorganized, and uncoordinated twitching of atrial musculature. It is the most common dysrhythmia that causes patients to seek medical attention. It may start and stop suddenly. Atrial fibrillation may occur for a very short time (paroxysmal), or it may be chronic. **Causes** Atrial fibrillation is usually associated with advanced age, Valvular heart disease, coronary artery disease, hypertension, cardiomyopathy, hyperthyroidism, pulmonary disease, Acute moderate to heavy ingestion of alcohol (“holiday heart” syndrome), or the aftermath of				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			open heart surgery. Sometimes it occurs in people without any underlying pathophysiology (termed lone atrial fibrillation). **Identifying features on the ECG;** 1. Ventricular and atrial rate: Atrial rate is 300 to 600. Ventricular rate is usually 120 to 200 in untreated atrial fibrillation Ventricular and atrial rhythm: Highly irregular 2. QRS shape and duration: Usually normal, but may be abnormal 3. P wave: No discernible P waves; irregular undulating waves are seen and are referred to as fibrillatory or f waves 4. PR interval: Cannot be measured 5. P: QRS ratio: many:1				

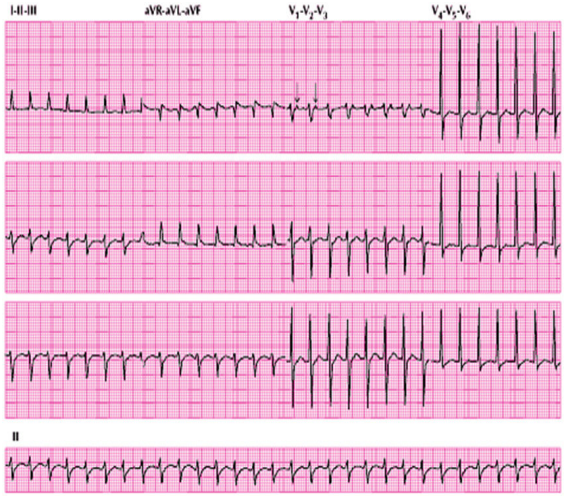
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			 				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			 6. A rapid ventricular response reduces the time for ventricular filling, resulting in a smaller stroke volume. 7. Because this rhythm causes the atria and ventricles to contract at different times, the atrial kick (the last part of diastole and ventricular filling, which accounts for 25% to 30% of the cardiac output) is also lost. This leads to symptoms of irregular palpitations, fatigue, and malaise. 8. There is usually a pulse deficit, a numerical difference				

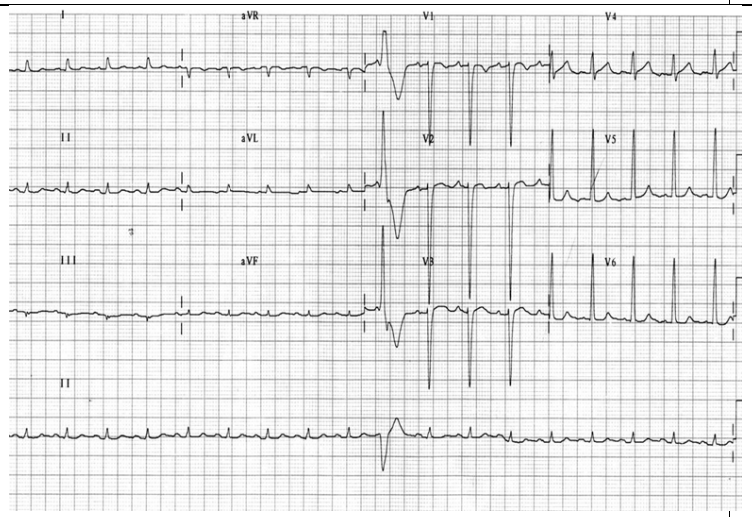
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			between apical and radial pulse rates. 9. The shorter time in diastole reduces the time available for coronary artery perfusion, thereby increasing the risk for myocardial ischemia. 10. The erratic atrial contraction promotes the formation of a thrombus within the atria, increasing the risk for an embolic event. 11. There is a two- to five-fold increase in the risk of stroke (brain attack). **Treatment of atrial fibrillation** • Depends on its cause and duration and the patient's symptoms, age, and comorbidities. • In many patients, atrial fibrillation converts to sinus rhythm within 24 hours and without treatment. • Both stable and unstable atrial fibrillations of short duration are treated the same as stable and unstable atrial flutter. • Cardio version may be indicated for atrial fibrillation that has been present for less than 48 hours, a				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			condition termed acute onset atrial fibrillation.[100-200 monophasic joules] • Cardio version of atrial fibrillation that has lasted longer than 48 hours should be avoided unless the patient has received anticoagulants, due to the high risk for embolization of atrial thrombi. • For atrial fibrillation of acute onset, the medications quinidine, ibutilide, flecainide, dofetilide, propafenone, procainamide (Pronestyl), disopyramide, or amiodarone may be given to achieve conversion to sinus rhythm. • Intravenous adenosine has also been used for conversion, as well as to assist in the diagnosis. • To prevent recurrence and to maintain sinus rhythm, quinidine, disopyramide, flecainide, propafenone, sotalol, or amiodarone may be prescribed. • Calcium-channel blockers [diltiazem (Cardizem, Dilacor, Tiazac) and verapamil (Calan, Isoptin, Verelan)] and beta blockers are effective in controlling the ventricular rate in atrial fibrillation,				

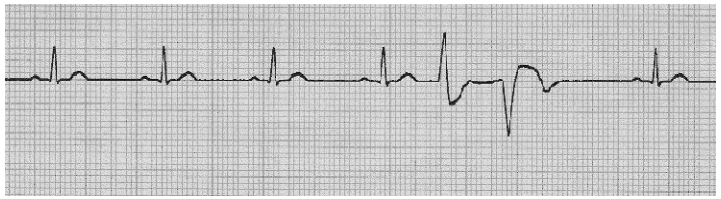
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			especially during exercise. • Use of digoxin is recommended to control the ventricular rate in those patients with poor cardiac function (ejection fraction less than 40%). • In addition, warfarin is indicated if the patient is at higher risk for a stroke (ie, is elderly or has hypertension, heart failure, or a history of stroke). • Aspirin may be substituted for warfarin for those with contraindications to warfarin and those who are at lower risk of stroke. • The choice of antithrombotic medication can be guided by transesophageal echocardiography. • Pacemaker implantation or surgery is sometimes indicated for patients who are unresponsive to medications.				

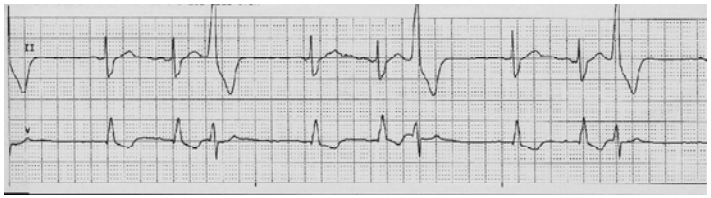
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Supra ventricular tachycardia  **ECG CHARACTERISTICS** • **Rhythm:** Regular • **Rate:** Greater than 100 beats/min; can be as fast as 280 beats/min • **P-wave:** Usually not visible • **PR interval:** Not measurable **QRS complex:** Usually narrow; may be wide if aberrant conduction occurs.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
21	40 min	The group should be able to explain the ventricular arrhythmias	**IV)VENTRICULAR DYSRHYTHMIAS:** **1. PREMATURE VENTRICULAR COMPLEX:** **Description** • A premature ventricular contraction (PVC) is a depolarization that arises in either ventricle before the nextexpected sinus beat, and is therefore labeled "premature." • They are generally easy to detect because the QRS iswide and bizarre looking. • Since PVCs originate in the ventricle, the normal sequence of ventriculardepolarization is altered. For example, instead of the two ventricles depolarizing simultaneously, a PVC willcause the ventricles to depolarize at different times or sequentially. • Conduction occurs more slowlythrough the myocardium than through specialized conduction pathways. This results in a wide (0.12 second orgreater) and bizarre-appearing QRS	PowerPoint presentation ECG booklet	Lecture cum Discussion, Explaining Clarifying doubts, Motivating	Listening, Asking doubts, Taking notes	What are ventricular arrhythmias?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			 The sequence of repolarization is also altered, usually resulting in an STsegment and T wave in a direction opposite to the QRS complex. After the PVC occurs, you may find a shortpause before the next QRS. This is called a Compensatory pause. The compensatory pause may or may not bepresent.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			TYPES OF PVC; **A.Unifocal PVCs:** When a PVC originates from a single focus, its morphology or waveform characteristics look the same eachtime. When a PVC looks the same each time, it is called a unifocal PVC (because it originates from one area). All of the PVCs from a unifocal source are identical in appearance.  **B. Multifocal PVCs:** In cases of greater irritability, several ventricular foci might begin to initiate ectopic beats. Multifocal PVCswill occur if more than one ectopic area begins to initiate early ventricular beats. For example, if three ectopicventricular sites began initiating PVCs, each site would produce a slightly different looking				

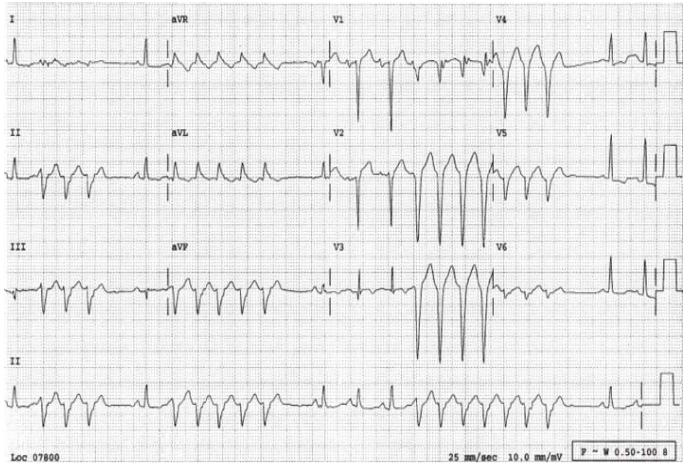
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			PVC waveform. The ECG criteria are basically the same as unifocal PVCs. Multifocal PVCs are considered more dangerouswhen compared to unifocal PVCs, as this represents a greater amount of myocardial irritability.  • PVCs may also occur in succession. When this happens, the PVCs are called a Couplet. (The strip above alsoshows a couplet.) • The term Ventricular Bigeminy is used for a grouped beating pattern when every other beatis a PVC (despite the underlying rhythm). For example, ventricular bigeminy is a when you see a pattern of onePVC, then one normal beat, then one PVC, followed by a normal beat.If every other beat is a PVC, ventricular bigeminy is present.				

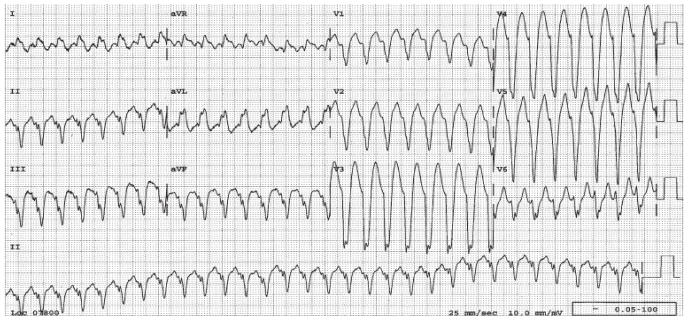
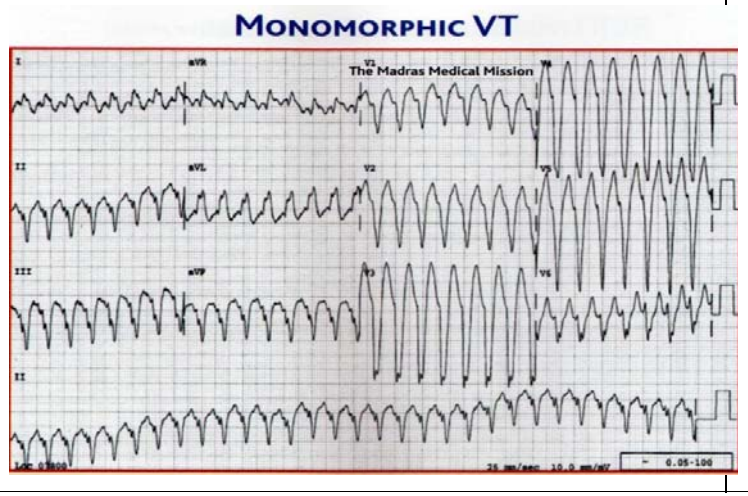
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• If every third beat is a PVC, the term VentricularTrigeminy is used; if every fourth beat is a PVC, Ventricular Quadrigeminy is present; and so forth. The stripbelow is an example of ventricular trigeminy.  Keep in mind. PVCs may occur as isolated complexes. or they may occur repetitively in pairs (two PVCs in row). When three or more PVCs occur in a row, whether unifocal or multifocal, **Ventricular Tachycard** (VT) is present. When VT lasts for more than 30 seconds, it is arbitrarily defined as **Sustained Ventricul Tachycardia.** **R on T Phenomenon:** • The T wave is a sensitive or vulnerable area in the cardiac electrical cycle. • Remember that the heart is nowrepolarizing and does not like to be stimulated at this time. • If an early ventricular beat comes in on top of ornear the T wave, the early beat could throw the heart into an uncontrollable repetitive pattern called ventriculartachycardia.				

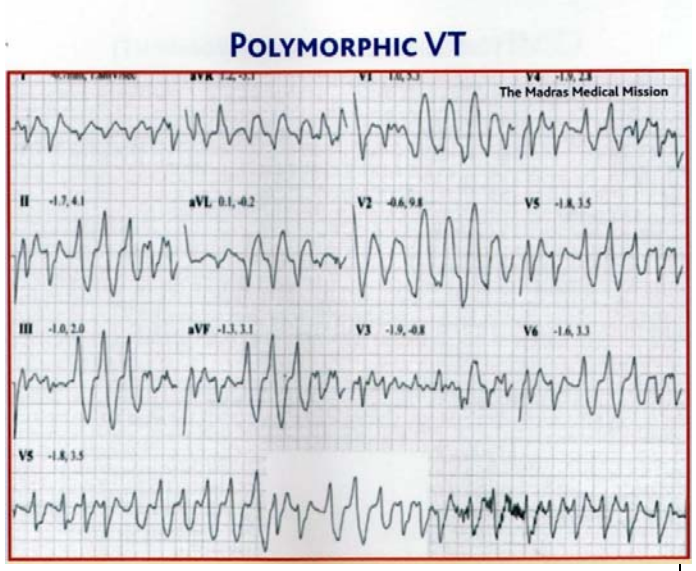
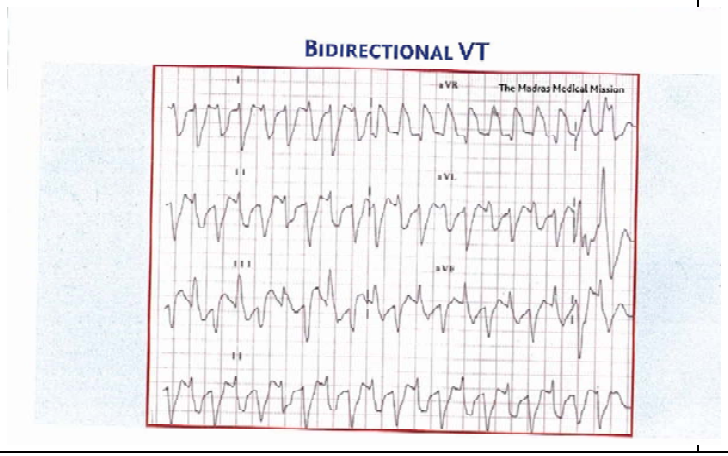
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• The term "R on T phenomenon" is used whenever an early ventricular beat lies near thevulnerable T wave. • Early detection canhelp prevent your patient from developing a life-threatening rhythm. **Possible Causes of PVCs:** • Caffeine, tobacco, alcohol • Digoxin toxicity • Exercise • Hypocalcemia • Hyperkalemia • New MI • Proarrhythmic effect of antiarrhythmic agents **ECG Criteria:** • Ventricular and atrial rate: Depends on the underlying rhythm (eg, sinus rhythm) • Ventricular and atrial rhythm: Irregular due to early QRS, creating one RR interval that is shorter than the others. PP interval may be regular, indicating that the				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			PVC did not depolarize the sinus node. • QRS shape and duration: Duration is 0.12 seconds or longer; shape is bizarre and abnormal • P wave: Visibility of P wave depends on the timing of the PVC; may be absent (hidden in the QRS or T wave) or in front of the QRS. If the P wave follows the QRS, the shape of the P wave may be different. • PR interval: If the P wave is in front of the QRS, the PR interval is less than 0.12 seconds. • P: QRS ratio: 0:1; 1:1 **Nursing Priorities:** • Assess the patient's response. • Many patients are asymptomatic, while others may feel palpitations or light-headed. **Potential Treatments:** Treatment is required only when PVCs are frequent or the patient has intolerable symptoms.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• **Asymptomatic**: Observation. Rule out hypokalemia and hypoxemia (both can trigger PVCs). Oxygen.Correct electrolyte imbalances. • **Symptomatic:** In the setting of an acute myocardial infarction, PVCs indicate the need to aggressivelytreat the ischemia/infarction with oxygen, nitroglycerin, morphine, and potential antiarrhythmic agents. **2. VENTRICULAR TACHYCARDIA:** **Description** Ventricular Tachycardia (VT) is defined as three or more consecutive PVCs in a row at a rate greater than 100beats per minute. VT is generally caused by single foci in either ventricle that fire at a rapid rate to override theSA node and thereby take control of the heart's rhythm. A short run of consecutive PVCs is often called a"burst" of VT. ECG characteristics include a rapid, regular rhythm with a wide QRS. The QRS is wide since the				

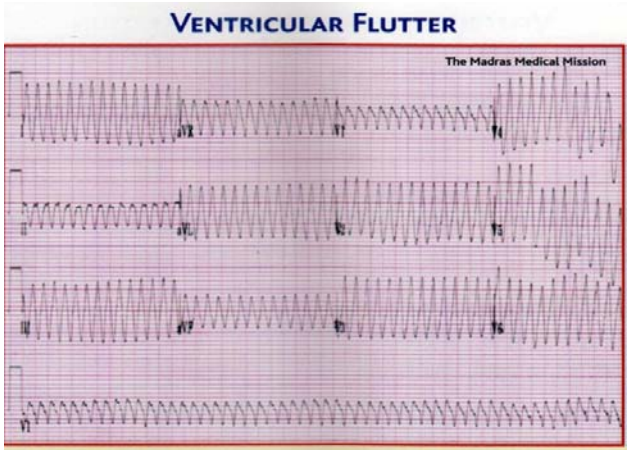
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			origin of therhythm is outside the bundle branches, thereby taking a longer time to conduct cell to cell within the ventricle. Ventricular tachycardia may be monomorphic (all QRSs with the same shape) **VENTRICULAR TACHYCARDIA** **BASED ON DURATION** **NONSUSTAINED MONOMORPHIC** **VENTRICULAR TACHYCARDIA**  				

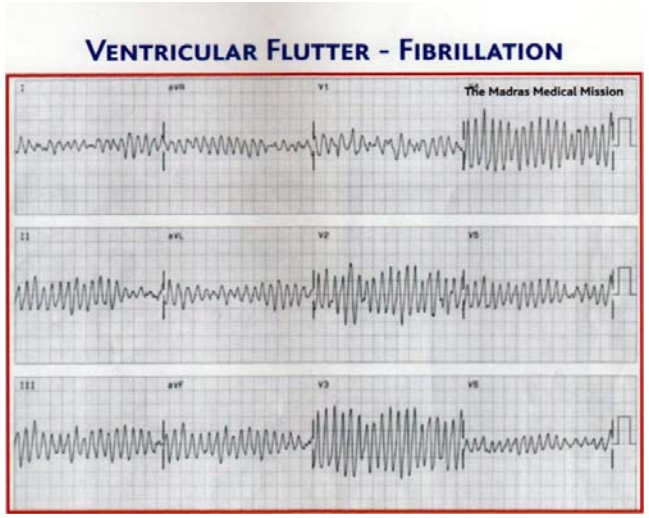
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			SUSTAINED MONOMORPHIC VENTRICULAR TACHYCARDIA  or **polymorphic** (varying QRSshapes during the tachycardia). **BASED ON MORPHOLOGY** 				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			 				

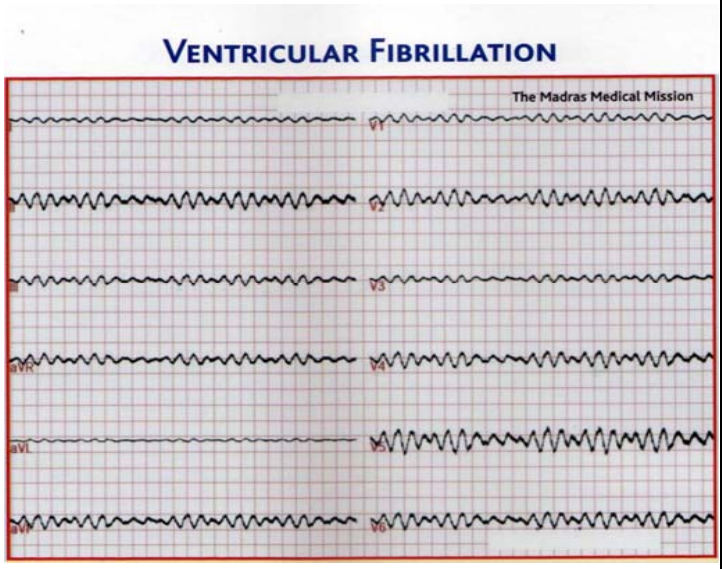
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• Atrioventricular dissociation is present, but not always noticeable. This means that the sinus node isdepolarizing the atria in a normal manner at a rate either equal to or slower than the ventricular rate. Thus sinusP waves sometimes can be recognized between QRS complexes but do not conduct down into the ventricles. • This arrhythmia may be either well tolerated or associated with life-threatening hemodynamic compromise. Thehemodynamic consequences of VT depend largely on the presence or absence of myocardial dysfunction (suchas might result from ischemia or infarction) and on the rate of VT (the faster the rate, the less well tolerated). **Possible Causes:** • Myocardial irritability • Acute MI • CAD • Drug toxicity				

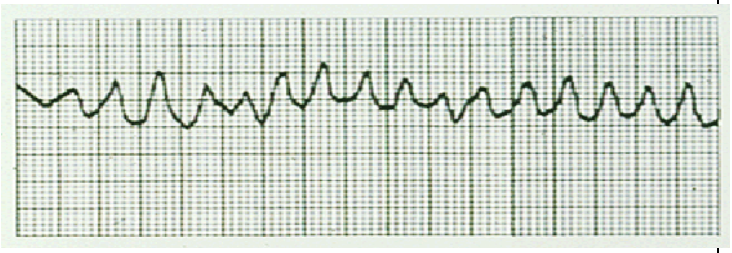
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• Electrolyte imbalance • Heart failure **ECG Criteria:** • Heart Rate: 100-250 bpm • Rhythm: Ventricular rhythm regular. • P waves: P waves may or may not be seen. If present, they are not associated with the QRS complex.(AV disassociation occurs with this rhythm, but P waves are not always seen) • PR Interval: Not applicable • QRS Width: >.12 seconds, wide and bizarre in appearance. Difficult to differentiate between the QRSand the T wave. **Nursing Priorities:** Check your patient's pulse and blood pressure to determine if this is stable, unstable (B/P <90) orpulseless VT. Treatment depends on the type of VT.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Potential Treatments: **Asymptomatic:** • Stable with normal heart function: administer procainamide, sotalol, amiodarone, or lidocaine. • Stable with impaired left ventricular function: administer amiodarone, lidocaine and then performsynchronized cardioversion. **Symptomatic:** • If unstable, prepare for immediate cardioversion. • If pulseless, administer epinephrine orvasopressin followed by defibrillation. 				

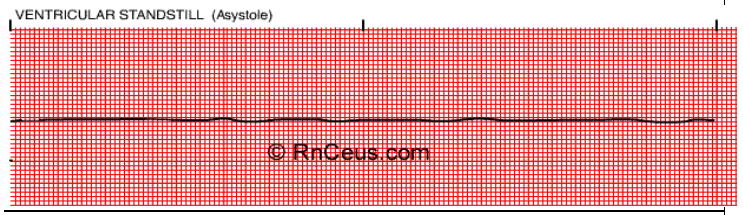
S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			ECG CHARACTERISTICS • **Rhythm:** Usually regular • **Rate:** Ventricular rate is usually 220-400 beats/min • **P-wave:** None seen • **PR interval:** Not measurable • **QRS complex:** Very wide, regular, sine-wave type of pattern 				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			VENTRICULAR FIBRILLATION: **Description** Ventricular fibrillation (VF) is the result of highly irritable ventricle(s), which begin to send out rapidlectrical stimuli. The stimuli are chaotic resulting in no organized ventricular depolarization. The ventricles donot contract because they never depolarize. For you *visual learners*... just imagine shaking a bowl full of Jell-O.Gently shake the bowl and watch the Jell-O quiver or "fibrillate." This is similar to what is happening withinthe heart. Because the ventricles are fibrillating and never contracting, the patient does not have a pulse, cardiacoutput, or blood pressure. The terms coarse and fine have been used to describe the amplitude of the waveforms in VF. With Coarse VF,the fibrillatory waves are more easily seen and are usually greater than 3mm in height (3 small boxes tall).Coarse VF usually indicates a more recent onset of VF, which could be more easily converted by				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			prompt...defibrillation. The presence of fine VF (which looks a bit like asystole and is less than 3mm in height) often... means there has been a considerable delay since collapse, and successful resuscitation is more difficult.  **Possible Causes:** • Acute MI • Untreated ventricular tachycardia • Underlying heart disease				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• Acid-base imbalance • Electrolyte imbalances such as hypokalemia, hyperkalemia, and hypercalcemia **ECG Criteria:** 1. Heart Rate: None. No discernable P waves or QRS complexes 2. Rhythm: Chaotic wavy recording. No discernable rhythm. 3. P waves: None 4. PR Interval: Not applicable 5. QRS Width: Not applicable  **Nursing Priorities:** • Check for an airway, breathing, and pulse per Basic Life Support (BLS) standards. Call for help.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• The patientwill be apneic, pulseless, and unresponsive. Begin CPR. VF treatment requires electrical therapy(defibrillation). • Resuscitation requires defibrillation and often requires emergency drugs per the AdvancedCardiac Life Support (ACLS) VF guidelines. • The sooner the patient is defibrillated, the more likely ofachieving spontaneous circulation. The longer the patient is in VF, the more difficult it is to convert the rhythm. **Potential Treatments:** • Initial treatment is always defibrillation. Only defibrillation provides definitive therapy. • Other priorities include..securing an airway, making sure the patient has IV access, and administering medications per guidelines.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			VENTRICULAR ASYSTOLE:  **Description** • Asystole represents the total absence of electrical activity. • To assure there is no electrical activity,check the rhythm in a second lead and make sure your monitor is working properly. • Asystole may occur as aprimary event in cardiac arrest, or it may follow VF. • In addition, the distinction between very fine VF and asystole may be very difficult. If it might be VF, it shouldbe treated, like VF, with defibrillation. • If no organized QRS complex is seen and the patient has a pulse, thenthe ECG is improperly connected, turned off, or improperly calibrated.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Possible Causes: • Severe metabolic deficit • Acute respiratory failure • Extensive myocardial damage or ruptured ventricular aneurysm **Nursing Priorities:** • Check rhythm in a second lead (make sure a lead has not fallen off). • If your patient has a pulse, they areobviously NOT in asystole. • If the patient is pulseless, initiate CPR and call for help **Potential Treatments:** • Continue CPR and secure airway and IV access. • Search for possible causes. Implement medication therapy perACLS guidelines.				
22	10Min	The group should able to	**MANAGEMENT OF DYSRHYTHMIA** • Dysrhythmia treatments depend on whether the	Power point presentation	Lecture cum Discussion,	Listening, Asking doubts,	What is the management of

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
		discuss the management of arrhythmias	disorder is acute or chronic as well as on the cause of the dysrhythmia and its actual or potential hemodynamic effects. • Acute dysrhythmias may be treated with medications or with external electrical therapy. • Many antiarrhythmic medications are used to treat atrial and ventricular tachydysrhythmias. • The choice of medication depends on the specific dysrhythmia, presence of cardiac failure and other diseases, and the patient's response to previous treatment. • The nurse is responsible for monitoring and documenting the patient's responses to the medication and for making sure that the patient has the knowledge and ability to manage the medication regimen. There are five main classes in the Singh Vaughan Williams classification of antiarrhythmic agents • Class I agents interfere with the sodium (Na^+) channel.		Explaining, Clarifying doubts	Taking notes	arrhythmias?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• Class II agents are anti-sympathetic nervous system agents. Most agents in this class are beta blockers. • Class III agents affect potassium (K^+) efflux. • Class IV agents affect calcium channels and the AV node. • Class V agents work by other or unknown mechanisms If medications alone are ineffective in eradicating or decreasing the dysrhythmia, certain adjunctive mechanical therapies are available. The most common are pacemakers for bradycardias and tachycardias, elective cardioversion and defibrillation for acute tachydysrhythmia, and implantable devices for chronic tachydysrhythmia. Surgical treatments, although less common, are also available. **PACEMAKER THERAPY:** A pacemaker is an electronic device that provides electrical stimuli to the heart muscle. Pacemakers are				

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			usually used when a patient has a slower-than-normal impulse formation or a conduction disturbance that causes symptoms. They may also be used to control some tachydysrhythmias that do not respond to medication therapy. Biventricular (both ventricles) pacing may be used to treat advanced heart failure that does not respond to medication therapy. Pacemakers can be permanent or temporary. Permanent pacemakers are used most commonly for irreversible complete heart block. Temporary pacemakers are used (e.g., after MI, after open heart surgery) to support patients until they improve or receive a permanent pacemaker **B.CARDIOVERSION AND DEFIBRILLATION:** • Cardioversion and defibrillation are treatments for tachydysrhythmias. • They are used to deliver an electrical current to depolarize a critical mass of myocardial cells. When the cells repolarize, the sinus node is usually able to recapture its role as the heart's pacemaker.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• One major difference between cardioversion and defibrillation has to do with the timing of the delivery of electrical current. • Another major difference concerns the circumstance: defibrillation is usually performed as an emergency treatment, whereas cardioversion is usually, but not always, a planned procedure. • Electrical current may be delivered through paddles or conductor pads. • Both paddles may be placed on the front of the chest, which is the standard paddle placement, or one paddle may be placed on the front of the chest and the other connected to an adapter with a long handle and placed under the patient's back, which is called an anteroposterior placement. • Instead of paddles, defibrillator multifunction conductor pads may be used. • The pads, which contain a conductive medium, are placed in the same position as the paddles. They are connected to the defibrillator and allow for hands-off				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			defibrillation. This method reduces the risks of touching the patient during the procedure and increases electrical safety. • AEDs use this type of delivery for the electrical current. • Whether using pads or paddles, the nurse must observe two safety measures. ➢ First, maintain good contact between the pads or paddles (with a conductive medium) and the patient's skin to prevent electrical current from leaking into the air (arcing) when the defibrillator is discharged. ➢ Second, ensure that no one is in contact with the patient or with anything that is touching the patient when the defibrillator is discharged, to minimize the chance that electrical current will be conducted to anyone other than the patient.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			THE IMPLANTABLE CARDIOVERTER DEFIBRILLATOR • The implantable cardioverter defibrillator (ICD) is a device that detects and terminates life-threatening episodes of VT or ventricular fibrillation in high-risk patients. • Patients at high risk are those who have survived sudden cardiac death syndrome, usually caused by ventricular fibrillation, or have experienced symptomatic VT (syncope secondary to VT). Nursing interventions for the patient with an ICD are provided throughout the preoperative, perioperative, and postoperative phases. In addition to providing the patient and family with explanations regarding implantation of the ICD in the preoperative phase, the nurse may need to manage acute episodes of lifethreatening dysrhythmias. In the perioperative and postoperative phases, the nurse carefully observes the patient's responses to the ICD and provides the patient and family with further teaching as needed (White, 2000)				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			The nurse can also assist the patient and family in making lifestyle changes necessitated by the dysrhythmia and resulting ICD implantation. **CARDIAC CONDUCTION SURGERY:** **1. ENDOCARDIAL ISOLATION** Endocardial isolation involves making an incision into the endocardium that separates the area where the dysrhythmia originates from the surrounding endocardium. The edges of the incision are then sutured together. The incision and its resulting scar tissue prevent the dysrhythmia from affecting the whole heart. **2. ENDOCARDIAL RESECTION** In endocardial resection, the origin of the dysrhythmia is identified, and that area of the endocardium is peeled away. No reconstruction or repair is necessary.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			3. CATHETER ABLATION THERAPY Catheter ablation destroys specific cells that are the cause or central conduction method of a tachydysrhythmia. It is performed with or after an EP study. Usual indications for ablation are AV nodal reentry tachycardia, atrial fibrillation, or VT unresponsive to previous therapy (or for which the therapy produced significant side effects). **Radiofrequency ablation:** The most often used method is radiofrequency, which involves placing a special catheter at or near the origin of the dysrhythmia. High-frequency, low-energy sound waves are passed through the catheter, causing thermal injury and cellular changes that result in localized destruction and scarring. The tissue damage is more specific to the dysrhythmic tissue, with less trauma to the surrounding cardiac tissue than occurs with cryoablation or electrical ablation.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Indications for radiofrequency catheter ablation of cardiac arrhythmias **1. Cryoablation:** Cryoablation involves placing a special probe, cooled to a temperature of −60°C (−76°F), on the endocardium at the site of the dysrhythmia's origin for 2 minutes. The tissue freezes and is later replaced by scar tissue, eliminating the origin of the dysrhythmia. **2. Electrical ablation**. \ In electrical ablation, a catheter is placed at or near the origin of the dysrhythmia, and one to four shocks of 100 to 300 joules are administered through the catheter directly to the endocardium and surrounding tissue. The cardiac tissue burns and scars, thus eliminating the source of the dysrhythmia. **COMPLICATIONS:** 1. Angina				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			2. Congestive heart failure 3. Heart attack 4. Shock 5. Stroke 6. Pulmonary embolism In addition to cardiac arrest, a potential complication that may develop over time is heart failure. Another potential complication, especially with atrial fibrillation, is a thromboembolic event. If the dysrhythmia necessitates treatment with medication, the beneficial and detrimental effects must be assessed. **Carotid Sinus Massage** Carotid sinus massage involves rubbing the large part of the arterial wall at the point where the common carotid artery, located in the neck, divides into its two main branches.				

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			NURSING MANAGEMENT: **<u>ASSESSMENT</u>** • Major areas of assessment include possible causes of the dysrhythmia and the dysrhythmia's effect on the heart's ability to pump an adequate blood volume. • When cardiac output is reduced, the amount of oxygen reaching the tissues and vital organs is diminished. • This diminished oxygenation produces the signs and symptoms associated with dysrhythmias. • If these signs and symptoms are severe or if they occur frequently, the patient may experience significant distress and disruption of daily life. • A health history is obtained to identify any previous occurrences of decreased cardiac output, such as syncope (fainting), lightheadedness, dizziness, fatigue, chest discomfort, and palpitations. • Coexisting conditions that could be a possible cause of the dysrhythmia (eg, heart disease, chronic obstructive pulmonary disease) may also be identified. All medications, prescribed and over-the-counter				

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			(including herbs and nutritional supplements), are reviewed. Some medications (eg, digoxin) can cause dysrhythmias. • A thorough psychosocial assessment is performed to identify the possible effects of the dysrhythmia and to determinewhether anxiety is a significant contributing factor. • The nurse conducts a physical assessment to confirm the data obtained from the history and to observe for signs of diminished cardiac output during the dysrhythmic event, especially changes in level of consciousness. ➢ The nurse directs attention to the skin, which may be pale and cool. ➢ Signs of fluid retention, such as neck vein distention and crackles and wheezes auscultated in the lungs, may be detected. ➢ The rate and rhythm of apical and peripheral pulses are also assessed, and any pulse deficit is noted.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			➢ The nurse auscultates for extra heart sounds (especially S3 and S4) and for heart murmurs, measures blood pressure, and determines pulse pressures. ➢ A declining pulse pressure indicates reduced cardiac output. Just one assessment may not disclose significant changes in cardiac output; therefore, the nurse compares multiple assessment findings over time, especially those that occur with and without the dysrhythmia. • After a temporary or a permanent pacemaker is inserted, the patient's heart rate and rhythm are monitored by ECG. • The pacemaker's settings are noted and compared with the ECG recordings to assess pacemaker function. • Pacemaker malfunction is detected by examining the pacemaker spike and its relationship to the surrounding ECG complexes . • In addition, cardiacoutput and hemodynamic stability are assessed to identify the patient's response to				

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			pacing and the adequacy of pacing. • The appearance or increasing frequency of dysrhythmia is observed and reported to the physician. • The incision site where the pulse generator was implanted (or the entry site for the pacing electrode, if the pacemaker is a temporary transvenous pacemaker) is observed for bleeding, hematoma formation, or infection, which may be evidenced by swelling, unusual tenderness, unusual drainage, and increased heat. • The patient may complain of continuous throbbing or pain. These symptoms are reported to the physician. The patient with a temporary pacemaker is also assessed for electrical interference and the development of microshock. • The nurse observes for potential sources of electrical hazards. All electrical equipment used in the vicinity of the patient should be grounded. Improperly grounded equipment can generate leakage of current capable of producing ventricular fibrillation. Exposed				

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			wires must be carefully covered with nonconductive material to prevent accidental ventricular fibrillation from stray currents. • The nurse, working with a biomedical engineer or electrician, should make certain that the patient is in an electrically safe environment. • Patients, especially those receiving a permanent pacemaker, should be assessed for anxiety. • In addition, for those receiving permanent pacemakers, the level of knowledge and learning needs of the patient and the family and the history of adherence to the therapeutic regimen should be identified.				
23	5Min	The group should be able to enlist the Nursing diagnosis	**NURSING DIAGNOSES:** Based on assessment data, major nursing diagnoses of the patient may include: 1. Decreased cardiac output. 2. Decreased cardiopulmonary tissue perfusion related to decreased cardiac output 3. Anxiety related to fear of the unknown 4. Deficient knowledge about the dysrhythmia and its	PowerPoint presentation	Lecture cum Discussion, Explaining, Clarifying doubts	Listening, Taking notes, asking doubts	What are the nursing diagnosis of arrhythmias?

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			treatment 5. Risk for infection related to pacemaker lead or generator insertion 6. Risk for ineffective coping 7. Deficient knowledge regarding self-care program **PLANNING AND GOALS:** The major goals for the patient may include eradicating or decreasing the incidence of the dysrhythmia (by decreasing contributory factors) to maintain cardiac output, minimizing anxiety, and acquiring knowledge about the dysrhythmia and its treatment. **1. Decreased cardiac output related to alteration in heart rate and rhythms evidence by ECG showing atrial fibrillation, irregular heart rate and low BP.** **Goal:** Pt's will convert back to Normal Sinus Rhythm within 24 hours.-Pt INR level will remain within 2-3 range.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			Nursing Interventions: • Assess the patient for the underlying cause and contributing factors. • Assess the patient for signs and symptoms of impending failure. This includes physical assessment, review of lab values, patient history and invasive hemodynamic parameters if available. • Correct the underlying cause. This may include reduction of pain and anxiety, fluid restriction, fluid replacement, restricting activities that precipitate dysrhythmias. (e.g. valsalva) or placing the patient on oxygen. • Maintain patency of all IV and other invasive lines. • Provide psychosocial support for patient and family members. • Promote adequate rest. • Maintain appropriate nutritional and fluid balances. • Patient teaching: includes acute activities such as reporting chest pain or dyspnea and wellness				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			teaching such as stop smoking, stress reduction, weight reduction, heart healthy diet, drug regimen, and relaxation. Other patient teaching activities include teaching the patient home blood pressure, pulse and weight monitoring. **2. DECREASED CARDIOPULMONARY TISSUE PERFUSION RELATED TO DECREASED CARDIAC OUTPUT.** **GOAL** Client will be able to maintain normal cardiopulmonary tissue perfusion. **Nursing Interventions:** • Assess the patient for causative factors. In the case of dysrhythmias, this would entail identifying the dysrhythmia and determining if it was causing a decrease in tissue perfusion. • Assess the patient for alteration in mentation, vital signs, postural blood pressure and signs of pulmonary				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			emboli. • Assess baseline labs: ABGs, electrolytes, BUN/creatinine, cardiac profile. • Document and report chest pain, noting precipitating factors. • Encourage restful atmosphere. • Teach patient to decrease cardiac workload. • Administer cardiac medications. • Teach patient to self administer medications. • Discuss necessary lifestyle changes such as stop smoking, diet, weight loss, appropriate exercises, and stress reduction. **NURSING INTERVENTIONS** **MONITORING AND MANAGING THE DYSRHYTHMIA** • The nurse regularly evaluates blood pressure, pulse rate and rhythm, rate and depth of respirations, and breath sounds to determine the dysrhythmia's hemodynamic effect.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• The nurse also asks patients about episodes of lightheadedness, dizziness, or fainting as part of the ongoing assessment. • If a patient with a dysrhythmia is hospitalized, the nurse may obtain a 12-lead ECG, continuously monitor the patient, and analyze rhythm strips to track the dysrhythmia. • Control of the incidence or the effect of the dysrhythmia, or both, is often achieved by the use of antiarrhythmic medications. • The nurse assesses and observes for the beneficial and adverse effects of each of the medications. • The nurse also manages medication administration carefully so that a constant serum blood level of the medication is maintained at all times. • In addition to medication, the nurse assesses for factors that contribute to the dysrhythmia (eg, caffeine, stress, non-adherence to the medication regimen) and assists the patient in developing a plan to make				

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			lifestyle changes that eliminate or reduce these factors. **1) MINIMIZING ANXIETY** • When the patient experiences episodes of dysrhythmia, the nurse maintains a calm and reassuring attitude. • This demeanor fosters a trusting relationship with the patient and assists in reducing anxiety (reducing the sympathetic response). • Successes are emphasized with the patient to promote a sense of confidence in living with a dysrhythmia. For example, if a patient is experiencing episodes of dysrhythmia and a medication is administered that begins to reduce the incidence of the dysrhythmia, the nurse communicates that information to the patient. • The nursing goal is to maximize the patient's control and to make the unknown less threatening. **2) PREVENTING INFECTION** • The nurse changes the dressing regularly and inspects the insertion site for redness, swelling, soreness, or any unusual drainage.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• An increase in temperature should be reported to the physician. • Changes in wound appearance are also reported to the physician. **3) PROMOTING EFFECTIVE COPING** • The patient treated with a pacemaker experiences not only lifestyle and physical changes but also emotional changes. • At different times during the healing process, the patient may feel angry, depressed, fearful, anxious, or a combination of these emotions. • Although each patient uses individual coping strategies (eg, humor, prayer, communication with a significant other) to manage emotional distress, some strategies may work better than others. • Signs that may indicate ineffective coping include social isolation, increased or prolonged irritability or depression, and difficulty in relationships. • To promote effective coping strategies, the nurse must				

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			recognize the patient's emotional state and assist the patient to explore his or her feelings. • The nurse may help the patient to identify perceived changes (eg, loss of ability to participate in contact sports), the emotional response to the change (eg, anger), and how the patient responded to that emotion (eg, quickly became angry when talking with spouse). • The nurse reassures the patient that the responses are normal, then assists the patient to identify realistic goals (eg, develop interest in another activity) and to develop a plan to attain those goals. • The nurse may also teach the patient easy-to-use stress reduction techniques (eg, deep-breathing exercises) to facilitate coping. **TEACHING PATIENTS SELF-CARE** • When teaching patients about dysrhythmias, the nurse presents the information in terms that are understandable and in a manner that is not frightening or threatening.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• The nurse explains the importance of maintaining therapeutic serum levels of Antiarrhythmic medications so that the patient understands why medications should be taken regularly each day. • In addition, the relationship between a dysrhythmia and cardiac output is explained so that the patient understands the rationale for the medical regimen. • If the patient has a potentially lethal dysrhythmia, it is also mportant to establish with the patient and family a plan of action to take in case of an emergency. This allows the patient and family to feel in control and prepared for possible events. • A referral for home care usually is not necessary for the patient with a dysrhythmia unless the patient is hemodynamically unstable and has significant symptoms of decreased cardiac output. • Home care is also warranted if the patient has significant comorbidities, socioeconomic issues, or limited self-management skills that could potentiate the risk for nonadherence to the therapeutic regimen.				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			• After pacemaker insertion, the patient's hospital stay may be less than 1 day, and follow-up in an outpatient clinic or office is common. • The patient's anxiety and feelings of vulnerability may interfere with the ability to learn information provided. • Nurses often need to include home caregivers in the teaching and provide printed materials for use by the patient and caregiver. • Priorities for learning are established with the patient and caregiver. • Teaching may include the importance of periodic pacemaker monitoring, promoting safety, avoiding infection, and sources of electromagnetic interference.				
	5Min		**SUMMARY AND CONCLUSION:** Arrhythmia being a major life threatening scenario; should be considered as emergency. Professionals should be aware about" treating the patients not merely the symptoms"				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			BIBILIOGRAPHY: 1. Black, M.J Hawks. (2004). *Medical-surgical nursing clinical management for positive outcomes* (7th ed.). Philadelphia: Elsevier publications 2. Stanley Davidson. (2006). *Davidson's Principles and Practice of Medicine* (20th Ed.) Churchill Living Stone, Elsevier. 3. Harkness, Dincher. (1999). *Medical surgical nursing total patient care* (10thedn). Missouri: Mosby publications. 4. Ignatavicius D Donna. (1999). *Medical surgical nursing*, (2nd ed.) Saunders publication 5. Kasper, Braunwald, Fauci, Hauser, Lango, Jameson (2005) *Harrison's principles of internal medicine*. New York McGraw-Hill medical publishing division .Pp:237-239 6. Lewis, S.L, Heitkember, M.C, Dirksen, S.R, O'brien P.G, Buchner. (2010). *Lewis Medical surgical nursing assessment and management of clinical problems*. U.S.: Elsevier publishers				

S.No.	Time	Specific Objective	Content	A.V Aids	Teaching Activity	Learning Activity	Evaluation
			7. Smeltzer, S.C. Bare B. (2004). Brunner and Suddarth's: *"Text Book of Medical Surgical Nursing* (10^{th} ed.). Lippincott publications.				

APPENDIX – F

LETTER SEEKING EXPERTS OPINION AND SUGGESTION FOR THE CONTENT VALIDITY TOOL

FROM,

Mr. Paul Joseph Ani

1st Year M sc Nursing

MMM College of Nursing

Mogappair West

Chennai -60

TO,

Forwarded Through

Principal,

MMM College of Nursing,

Mogappair West,

Chennai – 60

Respected Sir/Madam,

Sub: Expert opinion for content validation of research tool.

I, Mr. Paul Joseph Ani, 1st year M.Sc nursing student (Medical Surgical nursing) of MMM College of Nursing, request your good self, if you could kindly accept to validate my research tool on topic "A study to assess the effectiveness of Arrhythmia Interpretation Training Programme (AIT) on Knowledge and Arrhythmia Interpretation among staff nurses" at a selected hospital in Chennai.

I would be obliged if you would kindly affirm your acceptance to the undersigned with your valuable suggestion on this topic. I shall send details of my study along with the research tool.

Thanking you in anticipation.

Yours Sincerely

Mr. Paul Joseph Ani

LIST OF EXPERTS FOR CONTENT VALIDITY

1. **Dr.K.Jaishankar**
   Senior Consultant,
   Reg.No.49448
   Cardiology and Electro Physiology,
   The Madras Medical Mission, Chennai.

2. **Dr.S.R.Ramkumar**
   Senior Consultant, Cardiology,
   Reg.No. 50835,
   The Madras Medical Mission, Chennai

3. **Mrs.Ambily.A**
   Associate Professor,
   University College of Nursing,
   Gandhi Nagar,
   Kottayam, Kerala.

4. **Mrs.Suja J.S**
   Associate Professor,
   Govt. College of Nursing,
   Alapuzha, Kerala.

5. **Mrs.Lizy Sonia**
   Vice Principal,
   Apollo College of Nursing,
   Chennai.

6. **Mrs.Jaslina Gnanarani**
   Reader,
   Apollo College of Nursing,
   Chennai.

Content Validity Certificate

This is to certify that the tool developed by Mr.Paul Joseph Ani, 1st year MSc Nursing student of MMM College of Nursing,Nolambur(Affiliated toDr. MGR Medical University) is validated by the undersigned and can proceed to conduct the main study for dissertation entitled "Effectiveness of arrhythmia interpretation training programme(AIT) on knowledge and arrhythmia interpretation among staff nurses".

K. Jai Shankar.

Signature of the validator:

Name: Dr K. JAISHANKAR

Designation:
Senior Consultant
Cardiologist & Electrophysiologist

Dr. K. JAI SHANKAR
Reg No. 49448

Dr. K. JAISHANKAR, MD. D.M.,
SR. CONSULTANT CARDIOLOGY &
ELECTROPHYSIOLOGY
REGD. No: 49448
MADRAS MEDICAL MISSION
CHENNAI - 600 037.

Place:

Date:

Content Validity Certificate

This is to certify that the tool developed by Mr.Paul Joseph Ani, 1st year MSc Nursing student of MMM College of Nursing, Nolambur (Affiliated to Dr. MGR Medical University) is validated by the undersigned and can proceed to conduct the main study for dissertation entitled "Effectiveness of arrhythmia interpretation training programme (AIT) on knowledge and arrhythmia interpretation among staff nurses".

Signature of the validator:

Name: Dr. S. R. RAMKUMAR.

Designation: Senior consultant.
MD. DNB.

Dr. S.R. RAMKUMAR, MD. DNB.
Sr. CONSULTANT CARDIOLOGY
REGD. No. 50835
MADRAS MEDICAL MISSION
CHENNAI - 600 037

Place:

Date:

Content Validity Certificate

This is to certify that the tool developed by Mr.Paul Joseph Ani, 1st year MSc Nursing student of MMM College of Nursing, Nolambur (Affiliated to Dr. MGR Medical University) is validated by the undersigned and can proceed to conduct the main study for dissertation entitled "Effectiveness of arrhythmia interpretation training programme (AIT) on knowledge and arrhythmia interpretation among staff nurses".

Signature of the validator:

Name: Rohith. M

Designation: Asso. Professor
MCN, GNK

Place: Gandhinagar

Date: 7.11.14.

INSTITUTE OF NURSING EDUCATION, SME
GANDHINAGAR
KOTTAYAM-8
MAHATMA GANDHI UNIVERSITY

Content Validity Certificate

This is to certify that the tool developed by Mr.Paul Joseph Ani, 1st year MSc Nursing student of MMM College of Nursing,Nolambur(Affiliated toDr. MGR Medical University) is validated by the undersigned and can proceed to conduct the main study for dissertation entitled "Effectiveness of arrhythmia interpretation training programme(AIT) on knowledge and arrhythmia interpretation among staff nurses".

Signature of the validator:

Name: Suja. J.S.

Designation: Asst. Professor
Govt. College of Nursing
Alappuzha.

Place: Alappuzha.

Date:

Content Validity Certificate

This is to certify that the tool developed by Mr.Paul Joseph Ani, 1st year MSc Nursing student of MMM College of Nursing,Nolambur(Affiliated toDr. MGR Medical University) is validated by the undersigned and can proceed to conduct the main study for dissertation entitled "Effectiveness of arrhythmia interpretation training programme(AIT) on knowledge and arrhythmia interpretation among staff nurses".

Signature of the validator:

Name: LIZY SONIA

Designation: Vice Principal

Place:

Date:

Apollo College of Nursing
Chennai - 600 095

Content Validity Certificate

This is to certify that the tool developed by Mr.Paul Joseph Ani, 1st year MSc Nursing student of MMM College of Nursing,Nolambur(Affiliated toDr. MGR Medical University) is validated by the undersigned and can proceed to conduct the main study for dissertation entitled "Effectiveness of arrhythmia interpretation training programme(AIT) on knowledge and arrhythmia interpretation among staff nurses".

Jaslin Gnanarani

Signature of the validator:

Name: J. JASLINA GNANARANI

Designation: Reader

Place: Chennai

Date: 28-/10/2014

Apollo College of Nursing
Apollo
Chennai - 600 095

APPENDIX - G

ELECTROCARDIOLOGY COURSE

"BASICS & BEYOND"

4-A Dr.Jayalalitha Nagar, Mogappair, Chennai - 600 0037.

CERTIFICATE

This is to certify that Mr. PAUL JOSEPH ANI

has successfully completed the Electrocardiology Course - "Basics & Beyond" on 31st August 2014 organized by the Arrhythmia - Heart Failure Academy, Department of Cardiac Electrophysiology & Pacing, The Madras Medical Mission, Chennai.

Dr. Ulhas M Pandurangi
Chief - Cardiac Electrophysiology & Pacing
The Madras Medical Mission

Dr. Mullasari S Ajit
Director - Cardiology
The Madras Medical Mission

APPENDIX - H

CERTIFICATE OF ENGLISH EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Mr.Paul Joseph AniM.Sc Nursing II year student of Madras Medical Mission College of Nursing, Chennai conducted a dissertation work on **"A pre experimental study to assess the effectiveness of Arrhythmia Interpretation Training (AIT) programme on knowledge and arrhythmia interpretation among staff nurses at selected hospital, Chennai"**under the guidance of Mrs.AbithaAnandaSoundariyaas a partial fulfillment of The Tamil nadu Dr. MGR Medical University requirement for the award of M.Sc Nursing Degree is edited for English language appropriateness by S.SANKARI, M.A., M.Phil., B.Ed.

Signature:

Jaigopal Garodia Vivekananda Vidyalaya,
Matriculation, Higher Secondary School,
U - 6, Annanagar, Chennai - 40.

Seal:

APPENDIX - I

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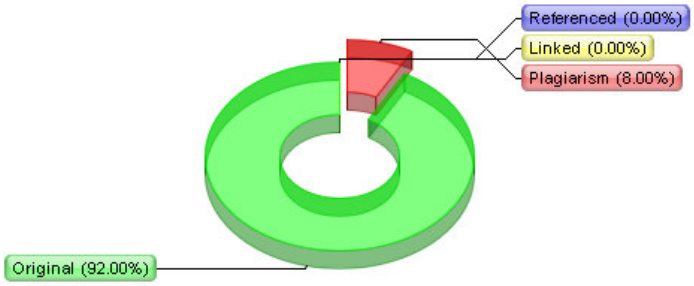

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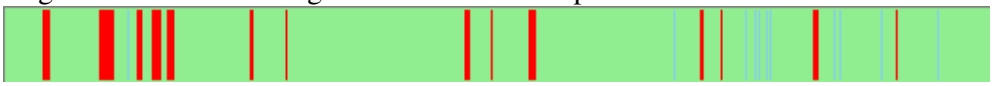

APPENDIX – J

PHOTOGRAPHS